# Quality of Life:
# Assessment for Transportation Performance Indicators

## Report on Minnesota Resident Questionnaire

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## Executive Summary

Quality of life is a commonly used term. Defining quality of life, however, is an ongoing challenge that experts often take on with minimal input from citizens. This groundbreaking research with the University of Minnesota Tourism Center sought citizen input on what comprised quality of life and what role transportation played in it. Further, this research explored in detail the important factors across the breadth of transportation and how the Minnesota Department of Transportation (MnDOT) was performing on these important factors. Results will inform MnDOT programming and services.

### A three-phased approach

The research encompassed three phases between 2010 and 2011: 1) an extensive literature review on quality of life, 2) 24 focus groups that asked Minnesota's citizens about their quality of life, and 3) a mail questionnaire about what matters in quality of life, transportation and their intersection. Our results reveal that:

- quality of life is complex and transportation plays an important and consistent role in it across Minnesota;
- transportation is critical to quality of life because it connects us to important destinations in aspects that matter most; and
- Minnesotans can readily identify what matters and how the state is performing within the breadth of transportation services.

### Seeking citizen input

The focus groups provided a wealth of information about what constituted quality of life. To quantify the importance of different parts of quality of life and transportation identified in the focus groups, we used a mailed questionnaire to a representative sample of 7,488 Minnesota residents, stratified by county. Considering traditional survey research responses, an impressive 45% of questionnaires (n=3,484) were returned. Those responding largely mirrored Minnesota although, as we expect in mail survey research, respondents were more frequently older, educated and white. The following information summarizes the key survey findings.

### Results:

### The quality of life context

Overall, Minnesotans are satisfied with their quality of life. The average level of satisfaction was nearly 6.15 on a scale from 1 to 7, with 7 being "very satisfied." Older Minnesotans indicated a higher satisfaction level than other age groups. We examined 11 quality of life areas: education, employment and finances, environment, housing, family, friends and neighbors, health, local amenities, recreation and entertainment, safety, spirituality, faith and serenity, and transportation. All quality of life areas were rated as important at some level (above 6 on a 7-point scale), including transportation. Notably, transportation held similar importance across all regions of Minnesota. Older Minnesotans rated education and employment as less important than those in the younger group. In contrast, older Minnesotan's rated transportation, spirituality, and local amenities and services as more important than those in younger groups. Considering quality of

life importance by region of residence, differences emerged in six of the areas. Generally, residents in the northeast identified all six of these areas as less important than others in the state.

**Transportation importance and satisfaction**

When Minnesotans described transportation, they talked about it across several major areas (in alphabetical order): access, design, environmental issues, maintenance, mobility, safety and transparency. Accessibility refers to access to destinations or people's ability to reach the destinations they must visit in order to meet their needs and desire to visit to satisfy their wants. Design describes the physical layout of the transportation system and includes the multiple components that make up the system (e.g. roads, signs, and lights). Environmental issues include air, water and light. Maintenance is a broad category that describes road surfaces, paint indicators, general repair, and seasonal upkeep. Mobility is defined as the movement of people from one place to another in the course of everyday life. Safety emerged as a primary category in discussing transportation related quality of life indicators. Multiple safety elements exist: physical conditions, human behavior, and the interaction among these factors. Transparency included subthemes of communication, finances and planning.

When asked to rate the importance of these areas, Minnesotans deemed all transportation areas evaluated as important—5.6 and above on a 7-point scale. Much like the older participants found transportation more important than those in younger groups, they also identified specific transportation areas as more important: design, mobility, communications and environmental issues.

Overall, respondents were satisfied with MnDOT services, with a total of 84% satisfied at some level. Considering satisfaction by age, older residents were consistently more satisfied with MnDOT performance in all transportation areas than the other age groups. When region of residence is taken into account, differences in satisfaction with MnDOT performance emerged in all transportation areas except accessibility. The differences varied by region. Notably, satisfaction was still high across regions.

Examining gaps between importance and satisfaction, four of the eight transportation areas were rated as MnDOT performing 'good work': accessibility, safety, mobility and design. Planning, environment and communications appeared in the 'lower emphasis', while maintenance was in the 'concentrate here' area. MnDOTs performance on six of eight transportation areas was rated as satisfactory when using a cutoff of 5 on a 7-point satisfaction scale. However, maintenance and planning fell below the 5 level.

To further understand what comprised satisfaction in the important areas of maintenance, respondents rated a number of aspects in each area. Six of the ten items received satisfactory evaluations: visible highway signs, clearing roads of ice and snow, clear pavement/road markings, rest area for road trips, roadside visual appeal and clearing roads of debris. When these items were used to predict satisfaction with maintenance, the following were significant predictors: smooth road surface, clearly visible road and pavement markings, the visual appeal of the road, clearing road debris, and rest areas for road trips. Notably, visible highway signage, clearing

sidewalks of snow, eliminating weeds and removing litter did not predict satisfaction with maintenance at the state level.

To understand the role of the different transportation areas in determining satisfaction with MnDOT services overall, we used them to predict that satisfaction. Each transportation area had a statistical chance to explain satisfaction. Seven of the 8 transportation areas were significant predictors of satisfaction with MnDOT services overall (by importance): maintenance, planning, accessibility, design, safety, communication and mobility. Environment was not a significant predictor in this model. This model also generally held true for commuters.

**MnDOT focus: Now and in the future**

To understand Minnesota residents' transportation priorities over the next 3 to 5 years and for the next generation, we asked survey participants to indicate the three most important areas where MnDOT should focus. Respondents listed maintenance, access and safety ideas as the most important areas for both the near term and long term, although their rank changed slightly between the time frames.

**Opportunities**

Our two years of data collection efforts with Minnesotans revealed the complexity of quality of life and insight into transportations role in quality of life. A variety of implications and opportunities for transportation emerge from these results, several of which are highlighted below.

***Maintain, map and maximize partnerships***

Across Minnesota it is clear that transportation plays an important and consistent role in quality of life. However, transportation is one of eleven areas of quality of life. As such, connecting and integrating with relevant partners is essential. Certainly MnDOT already has a number of vibrant partnerships in areas most important to Minnesota. Assessing the strength and status of those relationships may be in order. Beyond topical areas, multi-jurisdictional partnerships also need to be retained and strengthened toward a seamless and service-oriented transportation system. Investigating and implementing ways to maximize those partnerships toward seamless and comprehensive services can enhance MnDOTs role in quality of life as well as Minnesotan's satisfaction with quality of life.

***Evaluate performance measures***

MnDOT's performance in transportation should be commended, overall, as MnDOT's performance was viewed as satisfactory by more than 8 of 10 respondents. However, to retain that performance in the context of quality of life, performance measures and indicators would benefit from a review to confirm if and how they are addressing the areas important to Minnesotans.

Although overall satisfaction with MnDOT was high, opportunities to improve performance were identified in both planning and maintenance as evidenced by their satisfaction scores.

**Maintenance, access and safety** are priority areas for Minnesotans both now and in the future. Retaining or improving performance can happen by attending to the factors that predict satisfaction in these areas.

**Attention to maintenance** opportunities are very clear when considering its gap analysis between importance and satisfaction, contribution to satisfaction with MnDOT services overall, and priority in both the short- and long-term future. pportunities are very clear when considering its gap analysis between importance and satisfaction, contribution to satisfaction with MnDOT services overall, and priority in both the short- and long term future. Predictive analysis revealed smooth road surface, clear road and pavement markings, the visual appeal of the road, clearing road debris, and rest areas for road trips predicted satisfaction with maintenance statewide.

**Planning** is part of a larger 'transparency' area which was identified as a lower emphasis area for the current time period, but does appear to increase as a priority for the future. Notably, at the time of the survey MnDOT was embarking on a 50 year transportation planning process. Certainly residential choice, work patterns and multimodal developments are important factors for future planning processes.

***Attend to changing demographics***

Given the aged are a large and growing percent of the population, their higher satisfaction with transportation is important to note and retain. Identifying and attending to changing transportation needs through the life-time is a pressing issue in Minnesota and the U.S. as a whole. Similarly, the role transportation plays for non-White residents and new immigrants is important but under-researched. Ensuring diverse voices are incorporated into MnDOT programs and planning can strengthen them now and for the future.

**Additional research**

The relationship of transportation to other life areas is complex. Although this was a ground-breaking study regarding the complexities of quality of life and transportation, a variety of additional research questions remain and should be explored. These questions range from qualitative analysis of the important transportation areas among diverse audiences, through observational studies of consumer behavior and to robust quantitative analysis of commuter preferences.

# Chapter 1
# Introduction

'Quality of life' is increasingly of interest among transportation officials and academics alike. Despite this interest, research on quality of life and transportation is in its infancy. Therefore, an opportunity exists to improve transportation planning and management as well as advance transportation knowledge as it relates to quality of life. Assessing Minnesotan's content and importance of quality of life (QOL) and how it relates to transportation can inform the Minnesota Department of Transportation (MnDOT) program and service delivery.

As such, the purpose of this study was to assess and evaluate transportation-related quality of life indicators and the role of MnDOT programs and services in quality of life. Three inter-related approaches were undertaken: 1) a literature review (Guo and Schneider, 2010), 2) focus groups (Schroeder, Schneider, and Gustafson, 2011), and 3) a questionnaire. This project reports on the questionnaire.

## 1.1 Purpose and Objectives

The purpose of this project phase was to quantify the importance of previously identified transportation areas to overall quality of life as well as satisfaction with MnDOT transportation services. Specifically, the project sought to answer five questions:

1. If/how does transportation contribute to satisfaction with quality of life among Minnesotans?
2. If/how does satisfaction with transportation areas (access, etc.) contribute to satisfaction with transportation overall?
3. How important is each of the transportation areas (access, etc.)?
4. How satisfied are Minnesota residents with each of the transportation areas (access, etc.)?
5. How does perceived MnDOT performance compare with perceived importance on each of the transportation areas (access, etc.)?

## 1.2 Approach

Data representing how Minnesota residents perceive and evaluate transportation with regards to their quality of life were obtained by a self-administered mail survey spring 2011. The data sought to answer the five research questions of interest, as well as provide detailed information for various MnDOT departments. This quantitative data was analyzed statistically to answer the research questions of interest.

# Chapter 2
# Literature Background

Quality of life research (QOL) within and beyond transportation is briefly reviewed in this section. Researchers with diverse interests have explored QOL with a variety of methodologies. Within QOL research, however, attention to the role transportation plays in quality of life remains scant.

## 2.1 Quality of Life

Quality of life has been of research interest since the 1960s. As an indicator of the health and function status of individuals and society (Campbell, Converse, and Rodgers, 1976; WHOQOL, 1998; Das, 2008; Sarmiento, Schmid, Parra, Diaz-del-Castillo, Gomez, Pratt, Jacoby, Pinzon, and Duperly, 2010), QOL has been studied in various areas including health care (Ferrans, 1996; WHOQOL, 1998; Moons, Budts and Geest, 2006; Sarmiento et al., 2010), gerontology (Gabriel and Bowling, 2004; Spinney, Scott, and Newbold, 2009), public affairs (Das, 2008; Senlier, Yildiz, and Aktas, 2009), and community development (Sirgy, Rahtz, Cicic, and Underwood, 2000). QOL has been operationalized in a variety of ways (Ferrans, 1996; Moons et al., 2006) yet with a shared focus on perceived well-being. Well-being, happiness, life satisfaction, and living standard are used interchangeably in QOL research (Diener, Emmons, Larsen, and Griffin, 1985).

### 2.1.1 Measuring quality of life

As early as the 1960s, Cantril (1965) explored people's concerns with quality of life. Today, the selection of life domains is often highly research context specific (Malkina-Pykh and Pykh, 2008). Campbell et al. (1976) measured general quality of life as well as specific domains that included marriage, family life, health, neighborhood, friendships, housework, and job. Similarly, Sirgy et al. (2000) studied general quality of life with fourteen domains including job situation, financial situation, health, education, leisure life, environment, housing situation, and spiritual life. The World Health Organization's WHOQOL-100 and WHQOL-Brief assess six quality of life domains, with various sub-dimensions: 1) physical, 2) psychological, 3) level of independence, 4) social relationship, 5) environment, and 6) spirituality/religion/personal beliefs (WHOQOL, 1998). Among them, the environmental domain includes transport, work satisfaction, home environment, health and social care, participation in and opportunities for recreation/leisure activities, and physical environment. In their study, the Cronbach's α for the transportation scale which included four items was .83.

Hagerty, Cummins, Ferriss, Land, Michalos, Peterson, Sharpe, Sirgy, and Vogel's (2001) review of the 22 most frequently used QOL indices suggested seven domains be used for future research: relationship with family and friends, emotional well-being, material well-being, health, work and productive activity, feeling part of one's local community, and personal safety.

However, they also suggested that "supplementary domains may be important to particular populations" (Hagerty et al. 2001, p.75).

### 2.1.2 Predicting and understanding variance in perceived quality of life

Conclusive predictive models for QOL remain absent in the published literature. Existing empirical studies that attempt to predict quality of life find mixed predictive power and varied sets of important domains (London, Crandall, and Seals, 1977; Michalos and Zumbo, 1999; Sirgy et al., 2000; Turksever and Atalik, 2001; Kapteyn, Smith, and Soest, 2009, Senlier et al., 2009, Power, Bullinger, and Harper, 1999; Table 2.1). London et al. (1977) studied how job and leisure life predicted general QOL and found that they explained 25% of the variation in QOL. In Turksever and Atalik's (2001) study on QOL in seven city districts, the predictive power (R-squared) for each city district ranged from 16.6% to 99.6% and the predictive power for the general model for the city was 32.6%. Michalos and Zumbo (1999) also found differences in the QOL model's predictive power where it explained 49% and 53% of the variation in life satisfaction among rural seniors and university students. Satisfaction with transportation

**Table 2.1**
***Significant predictors of quality of life in various studies, 2011***

| Author (Year) | Population | Variance explained ($R^2$) | Significant predictors | Not significant predictor |
|---|---|---|---|---|
| London et al. (1977) | U.S. adults | .25 | Things done with family, Things done with friends, The work itself, and Pay, fringe benefits and security. | The people you work with, What it is like where you work, What you have available for doing your job, The people you see socially, The organizations you belong to, The sports and recreation facilities you yourself use, or would like to use, The entertainment you get from tv, radio, movies, and local events and places |
| Michalos and Zumbo, (1999) [a] | University clerical staff | .57 | Health, Financial security, Family relations, Job, Friendships, Housing, Recreation activity, Self-esteem, Transportation, and Education | Area lived in |
| | Rural seniors | .49 | Health, Financial security, Family relations, Friendships, Housing, Area lived in, Recreation activity, Religion, Self-esteem, Transportation, Government services, Living partner | - |
| | Eastern northern | .53 | Health, Financial security, Family relations, | Job |

| | | | | |
|---|---|---|---|---|
| | community | | Friendships, Housing, Area lived in, Recreation activity, Religion, Self-esteem, Transportation, Government services, Living partner | |
| | University of Guelph students | .53 | Health, Financial security, Job, Family relations, Friendships, Housing, Recreation activity, Self-esteem, Education | Area lived in, Religion, Transportation |
| | World sample of students | .49 | Health, Financial security, Family relations, Friendships, Housing, Area lived in, Recreation activity , Self-esteem, Transportation, Living partner, Education | Job, Religion |
| | Prince George residents in 1994 | .60 | Job, Friendships, Housing, Self-esteem, Government services, Living partner | Health, Financial security, Family relations, Area lived in, Recreation activity, Religion, Transportation, Education |
| | Prince George residents in 1997 | .64 | Financial security, Family relations, Job, Friendships, Self-esteem, Living partner | Health, Housing, Area lived in, Recreation activity, Religion, Transportation, Government services |
| Power et al. (1999)[b] | Seattle, WA | .75 | Physical domain, Psychological domain, Social relationships domain, Environment | - |
| Sirgy et al. (2000) | Communities from U.S. and Australia | .56 | Community, Family, Finances, Personal health, Leisure life, Spiritual life, | Job, Education, Friendship, Neighborhood, Environment, Housing, Cultural life, Social Status |
| Turksever and Atalik (2001) [b] | | .33 | Health, Climate, Crowding, Sporting, Housing conditions, Travel to work, Environmental pollution | Shopping facilities, Education provision, Cost of living, Noise levels, Job opportunities, Relation with neighbors, Parks and green areas, Leisure opportunities, Crime rate, Accessibility to public transportation, Traffic congestion |
| Senlier et al. (2009) | Turkish | .25 | Education facilities, Quality of environment, Safety, Public transport, Neighborhood | Social and cultural facilities, Sufficiency of health services, Quality of health services, |

*Note.* [a.] Michalos and Zumbo (1999) applied their simple linear QOL life model comprising fourteen items to various populations and obtained various predictive power and subset of items that were significant in explaining general QOL. [b]. Power et al. (1999) also reported their study finding in other fourteen countries, including Japan,

Israel, Australia, and U.K. [c]. Turksever and Atalik (2001) reported regression model explaining QOL both at city level and at district level. The table presented the regression model at the city level.

was a significant predictor of QOL for seniors but not for university students. From a different point of view, Chamberlain (1985)'s early research found an association between QOL and basic life values.

Researchers have identified various categories that predict people's QOL (Table 2.1). For example, London et al. (1977) found four significant predictors to QOL: a) things done with family, b) things done with friends, c) the work itself, and d) pay, fringe benefits and security. Michalos and Zumbo (1999) also found job opportunities were significant predictors of quality of life. However this is not to be confused with income as Kapteyn, Smith, and Soest (2009) identified income was the least important determinant of global life satisfaction, compared to other predictors. Education has unclear impacts on QOL: Michalos and Zumbo (1999) found that it was not a significant QOL indicator but Senlier et al. (2009) did. Power, Bullinger, and Harper's (1999) cross-culture test of the WHO's instrument found two major domains explained the most QOL variance: physical and psychological. Using a different method, Doi, Kii, and Nakanishi (2008) quantified the weights of five life areas and found "service and cultural opportunity" had the largest weight followed by "environmental benignity," and "safety and security", "spatial amenity" and "economic opportunity."

Similarly, while intuitively the importance of life domains differ by age and circumstance (Hu, 2009), as of the 1990s few studies included these distinctions (Cummins, Mccabe, Romeo, and Gullone, 1994). Even into the 21st century, few studies have addressed this issue. Instead, research has tended to focus on single age groups. For example, Gabriel and Bowling's (2004) focus-group study with individuals age 65 and older found several QOL themes were important, including access to local facilities and services, transportation, good health and mobility, good social relationships, help and support.

Like the paucity of QOL studies by age groups, few research studies compare QOL across different geographic locations. At a national level, Kapteyn, Smith, Soest, and Netspar (2009) compared global life satisfaction in the Netherlands and the U. S. They found that family and social relations best predicted global life satisfaction, followed by job/daily activity, health and income. At the local level, Moller (2001) identified differences in perceived QOL and satisfaction with public service among residents in Durban, South Africa's living areas. Suburban residents reported significantly higher satisfaction with QOL than those in townships and informal settlements. However, residents living in suburban areas reported significantly lower satisfaction with their Metro Council's performance. Turksever and Atalik (2001) found global satisfaction predictors varied in each urban district they assessed as well as between district and city levels. For example, access to public transportation significantly predicted QOL in three of Istanbul's seven districts, but it was not a significant predictor at the city level. At the city level, "travel to work" significantly predicted QOL but it was not significant at any district

level. The number of predictors between geographic levels was also different: some districts had only two significant predictors of QOL while others had five significant predictors.

### 2.2 Quality of life and transportation

Transportation has emerged as an important, yet poorly understood, element to quality of life. Further, rather than a holistic approach to transportation, select transportation areas are studied such as public transit and parking (Senlier et al. 2009), accessibility and mobility (Doi, Kii, Nokanishi, 2008), or the transportation systems efficiency (Das, 2008).

The degree to which transportation or aspects of transportation affect QOL varies. Michalos and Zumbo (1999) found transportation's influence on satisfaction with life was significant, yet very weak ($\beta < .1$). Forkenbrock's (2004) focus group study among Iowa residents found several transportation items were important to residential QOL: commuting, safety, and choice of transportation modes. Turksever and Atalik (2001) found travel to work was a significant predictor to life satisfaction, yet accessibility to public transportation and traffic congestion were not. In contrast, public transport did predict quality of life in Turkey according to Senlier et al. (2009). Shafer, Lee, and Turner (2000) studied if and how greenway trails influence QOL, finding urban greenway trails were perceived as contributing most to community QOL through resident health/fitness, the natural areas they provide, better land use and resident pride.

As of 2011, a single study quantitatively addressed the influence of transportation on QOL by mode of travel (Arlington County, 2007). In their assessment, Arlington County determined QOL had several predictors, including transportation. In contrast, safety, shopping opportunities, ease of getting around the area, and diversity were not significant QOL predictors. QOL predictors also differed by mode of travel (Table 2.2).

**Table 2.2**

***Significant predictors of quality of life by different travel modes (Arlington County, 2007)***

| Travel Mode | Significant quality of life predictors |
|---|---|
| Drive alone | public education, transportation system and services, ease of getting around the area, entertainment and recreation opportunities, safety, attractive residential communities, the economy |
| Train | ease of getting around the area, public education, safety, entertainment and recreational opportunities, attractive residential communities, transportation system and services, diversity |
| Bus | ease of getting around the area, entertainment and recreation opportunities, public education, safety |
| Carpool /vanpool | ease of getting around the area, the economy, public education, attractive residential communities |

| | |
|---|---|
| Bike | job opportunities, transportation system and services, public education, ease of getting, and the economy |
| Walk | public education, ease of getting around the area, safety, transportation system and services, entertainment and recreational opportunities |

As of 2011, several state transportation departments have integrated QOL into their performance measurements, typically with objective measures such as highway fuel use per vehicle mile traveled or population within a two-hour drive of commercial air service (Table 2.3). However, objective conditions do not always reflect consumer satisfaction (Cummins, 2000; Das, 2008) and thus there is a need to engage consumers and integrate their ideas more explicitly.

**Table 2.3**
***Quality of life related performance measurement among departments of transportation, 2011***

| Agency | Quality of life related performance measurement |
|---|---|
| Connecticut Department of Transportation (2009) | Specific projects including Transit Oriented Development, Diesel Locomotive Initiatives; aviation enhancing quality of life (Bradley International Airport); airport noise mitigation; Bradley gong green; recycled construction and maintenance materials; improving winter highway maintenance; new M8 rail fleet; buses and bus facilities; congestion; traffic incident management; traffic management systems; bikeways, walkways and trails; business development program |
| Virginia Department of Transportation (Smith, 2009) | Tons per year of mobile source emissions; tons per year of mobile source greenhouse gas emissions; fuel usage per capita; acres of wetlands replaced. |
| Oregon Department of Transportation (Reif & Brian, 2005) | Transportation cost index |
| Arlington County Commuter Service (2007) | Ease of getting around without car, choice/variety of options, cost, time required to make trips, convenience, dependability, safety, comfort, Arlington County Commuter Service is meeting residents needs, ability to travel around AC, ease of getting around with car, ease of getting around by bus, ease of getting around by bicycle, ease of getting to other destinations without a car. |

Several transportation areas of interest were identified in focus groups with Minnesota residents in 2010: access, design, environment, maintenance, mobility, safety, and transparency

(Schroeder, Gustafson, and Schneider, 2011). Of these, only a few have received any attention in the research literature as they relate to QOL: mobility, safety, and design.

Researching regarding the impact of mobility on QOL has focused on the aged and people with functional impairment (Gabriel and Bowling, 2004; Hjorthol, Levin, and Siren, 2010; Gagliardi, Marcellini, Papa, Giuli, and Mollenkopf, 2010). Mobility and accessibility are consistently identified as important among the aged (Spinney et al., 2009; Loti and Koohsari, 2009; Hjorthol et al. 2010). For example, Gabriel and Bowling's (2004) focus group study with older people identify access to local facilities and services, transportation, good health and mobility with other four life domains as an important theme. Hjorthol, Levin, and Siren (2010) studied mobility of different groups of older people and found car ownership and use among older people more than the comparable age groups 20-25 years ago. Gagliardi et al. (2010) found driving a car was an important predictor of mobility satisfaction in Italy and Germany but not a predictor of life satisfaction. Similarly, in their research, use of public transportation was a significant predictor of mobility satisfaction in Italy, but not life satisfaction in either Italy or Germany.

Safety has been recognized as an important indicator of QOL as well as a transportation evaluation criterion. In Parra, Gomez, Sarmiento, Buchner, Brownson, Schimd, Gomez, and Lobelo's (2010) work, traffic safety was positively associated with health-related quality of life among older adults. Chatterjee, Wegmann, Fortey, and Everett (2001) summarized how several metropolitan planning organizations (MPOs) addressed safety and security issue in both the long-range and short-range transportation planning processes. Their case study-oriented project found although safety and security were reflected in planning policies and goals and short-range project selection, there were few instances in which long-range planning incorporated these issues.

Although the general role of transportation system design on QOL is rarely studied, various studies support the link between the built environment, including transportation, and public health (Frank and Engelke, 2001; Frank and Kavage, 2009). Studies suggest providing a walkable environment increases physical activity levels and promotes neighborhood QOL (Frank and Kavage, 2009; Frank, Sallis, Saelens, Leary, Cain, Conway, and Hess, 2009). However, Sarmiento et al. (2010) found the walkability indicators such as bike lane density, street network density, and distance to transportation were not significant predictors to WHOQOL scores.

This brief review of QOL research reveals an opportunity for practitioners and researchers alike to better understand the effect of transportation in general as well as specific transportation areas on QOL. The following chapter introduces the research methods used to address if and how transportation impacts QOL among Minnesotans, the role of various transportation areas to transportation satisfaction, and the relationship between importance and satisfaction with MnDOT performance on various transportation areas.

# Chapter 3
# Study Method

Data representing how Minnesota residents perceive and evaluate transportation with regards to their quality of life (QOL) were obtained by a self-administered mail survey in spring 2011. The data sought to answer the five research questions of interest as well as provide detailed information for various MnDOT departments.

## 3.1 Data Collection

A representative sampling frame of 7,488 Minnesota residents, stratified by county, was obtained from Survey Sampling International. Counties were grouped into five regions based on other state administered regions and include metro, central, northeast, northwest, and south (Figure 3.1 and Table 3.1).

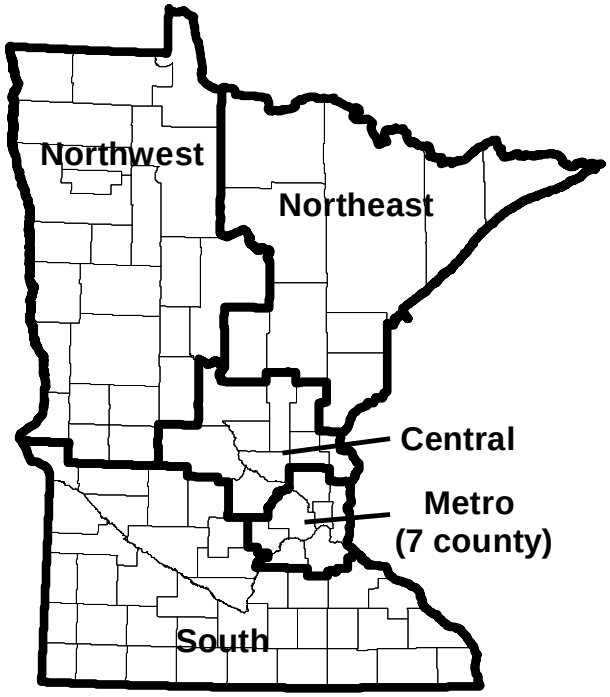


***Figure 3.1.*** **Regions identified and used for data acquisition and analysis**

The mailing process followed a modified Dillman, Smyth, and Christian (2007) survey method. Selected residents received an initial mailing packet that included a letter requesting they complete the questionnaire (Appendix A) along with a self-addressed, stamped envelope. One week later potential respondents received a reminder postcard (Appendix B) and two weeks later, non-respondents received a second mailing of the entire survey packet. All of the mailings were conducted April through May, 2011.

**Table 3.1**

***Counties identified and regions used for data acquisition, Minnesota, 2011***

| Region | County |
|---|---|
| Central | Isanti, Sherburne, Stearns, Wright, Benton, Kanabec, Mille Lacs, Morrison |
| Metro | Chisago, Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, Washington |
| Northeast | Koochiching, Aitkin, Crow Wing, Itasca, Cook, Lake, St. Louis, Carlton, Pine |
| Northwest | Kittson, Marshall, Pennington, Red Lake, Roseau, Becker, Douglas, Otter Tail, Todd, Beltrami, Lake of the Woods, Cass, Clearwater, Hubbard, Wadena, Grant, Pope, Stevens, Clay, Mahnomen, Norman, Polk, Traverse, Wilkin |
| South | Dodge, Freeborn, Le Sueur, Mower, Rice, Steele, Waseca, Big Stone, Blue Earth, Brown, Chippewa, Cottonwood, Faribault, Jackson, Kandiyohi, Lac Qui Parle, Lincoln, Lyon, Martin, McLeod, Meeker, Murray, Nicollet, Nobles, Pipestone, Redwood, Renville, Rock, Sibley, Swift, Watonwan, Yellow Medicine, Fillmore, Goodhue, Houston, Olmsted, Wabasha, Winona |

## 3.2 Measures

A mail questionnaire was developed based on previous QOL and transportation research. The questionnaire was reviewed by MnDOT personnel and pre-tested with an online community sample that MnDOT maintains. The questionnaire included several sections: 1) residential experience, 2) travel mode for various trips, 3) general QOL satisfaction, 4) importance of various life areas, 5) the importance and satisfaction with several transportation areas (accessibility, design, environment, maintenance, mobility, safety, long-term planning and communications), 6) satisfaction with transportation in community, 7) satisfaction with MnDOT services, as well as 8) demographics (questionnaire is Appendix A).

### 3.2.1 Quality of Life

Quality of life was measured with a scale of general satisfaction and a rating of the importance of eleven life areas. Based on the widely used World Health Organization scale, the general satisfaction with quality of life was measured with the question "how satisfied are you with the quality of your life" using a 7-point scale, where 1 = very dissatisfied and 7 = very satisfied (WHOQOL, 1998). The eleven life areas were developed based on a literature review (Guo and Schneider, 2010) and previous focus group study of quality of life (Schroeder, et al., 2011). The eleven life areas included 1) education, 2) transportation, 3) environment, 4) housing, 5) family, friends and neighbors, 6) health, 7) safety and security, 8) spirituality, faith and serenity, 9) local services and amenities, 10) recreation and entertainment, as well as 11) employment and

finances. Respondents indicated the importance of each area "as a contributor to your quality of life" with a 7 point scale where 1 = very unimportant to 7 = very important.

### 3.2.2 Satisfaction

Satisfaction with community transportation and the current transportation situation was measured with four items adopted from WHOQOL (1998). A single item requested respondents to rate their satisfaction with transportation in their community on a scale from 1 = very dissatisfied to 7 = very satisfied. Three more specific items inquired "to what extent do you have adequate means of transportation," "how much do difficulties with transportation restrict your life," and "to what extent do you have problems with transportation options." Respondents indicated the current transportation situation with these items by rating them on a 5-point scale where 1 = completely to 5 = not at all.

Satisfaction was assessed for seven transportation areas identified in the focus groups: accessibility, design, environment, maintenance, mobility, safety, and transparency. Each area was measured using items developed from the 2010 literature review (Guo and Schneider, 2010), previous MnDOT research, and the results from 2010 focus groups (Schroeder et al. 2011). The number of items measuring each transportation area ranged from four to ten (Table 3.2). For example, accessibility items included "access to taxis and other similar service transportation options" and "access to buses between cities." Design items included "highway sign placement (including alternate route signs, speed limit)" and "stoplight timing." Environment items included, "noise pollution from traffic" and "air pollution." Maintenance items included "clearing roads of snow and ice" and "keeping road surfaces smooth." Mobility items included "travel time to or from the Twin Cities" and "commute time to or from work." Transparency was measured with a four item scale. Because communications and planning were identified as sub-themes of transparency in the focus groups (Schroeder et al. 2011), they were only examined as individual variables and not scaled variables.

Respondents rated their satisfaction with each item using 7-point scales, where 1 = very (unsatisfied or unsafe) and 7 = very (satisfied or safe). Various question constructions were used to elicit responses, including "How satisfied are you with the following parts of (transportation area)", "How safe do you feel on the road with other drivers" and "How safe is your community for bicyclists." Some questions used a slightly different approach by asking respondents to rate their agreement with statements such as "There is so much traffic along the street I live on that it makes it difficult or unpleasant to walk in my neighborhood" and "My neighborhood is safe enough for an 80-year-old senior to walk around the block."

**Table 3.2**
***Item and scale statistical summary for predictor variables, Minnesota, 2011***

| Scale | Questionnaire item number | # of Items | Scale Mean | Cronbach's Alpha |
|---|---|---|---|---|
| General transportation satisfaction | Q8 | 3 | 4.61 | .62 |
| Quality of life assessment | Q10 | 11 | 6.39 | .82 |
| Satisfaction with roadway design | Q11 | 9 | 4.78 | .83 |
| Evaluation of transportation and environmental related issues | Q12 | 6 | 3.16 | .85 |
| Evaluation of safety | Q13 & Q15 | 12 | 5.09 | .84 |
| Satisfaction with accessibility | Q14 | 11 | 4.94 | .87 |
| Satisfaction with mobility | Q14 | 7 | 4.98 | .83 |
| Satisfaction with maintenance | Q16 | 10 | 5.01 | .87 |
| Satisfaction with MnDOT transparency | Q20 | 4 | 5.11 | .90 |
| Importance of transportation areas | Q17 | 8 | 6.32 | .80 |
| Satisfaction with transportation areas | Q18 | 8 | 5.37 | .89 |

3.2.3. Importance and gap analysis

Respondents rated the importance and satisfaction with each transportation area (accessibility, design, environment, maintenance, mobility, safety, and communications and planning) on seven point scales. Respectively, the 7-point scales ranged from 1 = very unimportant to 7 = very important and 1 = very dissatisfied to 7 = very satisfied.

Satisfaction with MnDOT and its services was also assessed with a general question: "Considering what you know about the Minnesota Department of Transportation overall, how satisfied are you with the services provided" on a 7-point scale where 1 = very dissatisfied and 7 = very satisfied. Four specific questions sought respondents' level of agreement that MnDOT "does what is best for Minnesota," "acts in a financially responsible manner," "considers customer concerns and needs when developing transportation plans," and " provides helpful and relevant information to citizens."

3.2.4 Respondent background information

Community living experience was measured with three items. Specifically, respondents were asked to report 1) how many years they have lived in Minnesota, 2) how many years they have lived in the community in which they were surveyed, and 3) how many months of the year they lived in the community.

Travel behavior measures included those specific to commuters (travel distance, number of days commuting, trip timing, and satisfaction with predictability of commute) as well as mode choice for various types of trips. In addition, the frequency of using public transportation and riding their bike outdoors annually in Minnesota were queried.

Socio-demographic variables were assessed mirroring past research and the U.S. Census. Variables included gender (male, female, prefer not to answer), age (what year were you born?), ethnicity/race, employment status, education, income, disability, number people living in household, and number of automobiles in household. Also, current or former employment with MnDOT was also asked to understand if and how MnDOT employment influenced answers to these responses.

**3.3 Data Analysis**

Data analysis was done in SPSS version 19.0. First, the data were checked for accuracy and usability. Second, descriptive statistics were performed on all data to answer the basic questions about the sample and their responses. Third, former or current MnDOT respondents were identified (n = 35) and then differences between them and non-MnDOT employees were explored. Specifically, differences in QOL assessments and satisfaction with the transportation areas were assessed using t-tests. MnDOT employees differed on only one of the eleven QOL items (health) but differed consistently on satisfaction with transportation areas (employee means were consistently higher). Therefore, former and current MnDOT employees were removed from the analysis on transportation satisfaction.

The first research question focused on if and how transportation contributed to satisfaction with quality of life among Minnesotans. To address this question, the quality of life areas and the single quality of life satisfaction item were used. Correlations among the variables revealed that neither singularity nor multi-collinearity were a problem. Stepwise regression was performed where the areas were regressed on the single QOL measure. This predictive procedure was repeated with each of the five administration regions identified as well as with three age groups (18-34, 35-59, 60+). Checks for suppressor variables were conducted by comparing the sign of the dependent and independent variables correlations and regression coefficients: a change in direction indicates suppression. To compare the importance of quality of life area across regions, analysis of variance (ANOVA) was performed with the appropriate comparison tests employed (Tabachhik and Fidell, 2006). For regional comparisons, Tukey's post-hoc test was used to identify differences among the regions. For comparisons by age groups, respondents were

grouped into age categories based on previous MnDOT work (18-34; 35-59; 60+) and compared with a Bonferroni as appropriate.

The second research question focused on if and how satisfaction with transportation areas (access, etc.) contributed to satisfaction with transportation overall. To address this question, the multiple items measuring the transportation areas were of interest as were the single satisfaction items with these broad categories. Similarly, three potential measures of transportation satisfaction were of interest. Two approaches were taken to predict satisfaction with transportation: 1) single satisfaction measures were used to predict different transportation satisfaction measures, and 2) scaled transportation areas were used to predict different transportation measures. In the first approach, respondents' single satisfaction ratings with each of the broad categories was of interest (i.e. how satisfied are you with your ability to get places you need and want to go). Satisfaction with transportation was assessed three different ways: 1) a three item scale that assessed the current transportation situation (Appendix A, Question 8); 2) a single measure of satisfaction with the transportation in a community (Appendix A, Question 7); 3) a single measure of satisfaction with MnDOT services overall (Appendix A, Question 19 single item). The three-item, transportation-situation scale had a reliability of .61. Correlations among the variables revealed that neither singularity nor multi-collinearity were a problem. Given there is little empirical evidence and theory related to these areas, stepwise regression was employed and significant predictors retained in the analysis. Specifically, stepwise regression was performed where satisfaction with each of the transportation areas were regressed on the 1) three item scale, 2) single community transportation satisfaction and 3) MnDOT service satisfaction question. The latter was of primary interest and retained in the main results.

In the second approach, each of the transportation areas with multiple items assessing respondent satisfaction or perceived impact (accessibility, design, environment, maintenance, mobility, safety,), were scaled and the average scale score used as a predictor variable. All scales had acceptable reliabilities as they were above a Cronbach's alpha of .82 (Table 3.2). Correlations among the variables revealed that neither singularity nor multi-collinearity were a problem. Given there is little empirical evidence and theory related to these areas, stepwise regression was employed and significant predictors retained in the analysis. Specifically, stepwise regression was performed where the transportation area scales were regressed on the 1) three item scale, 2) single community transportation satisfaction and 3) MnDOT service satisfaction question.

The third research question addressed the importance of each of the transportation areas. Importance was assessed with both a rating and a prioritization method. Respondents rated the importance of each transportation item and 5.0 was used as the lowest score where items were considered important. Respondents then prioritized the two most important transportation areas by identifying from the provided list them in writing. ANOVA with Tukey's post-hoc test identified differences in importance among the regions. For comparisons by age groups, respondents were grouped into age categories based on previous MnDOT work (18-34; 35-59; 60+) and compared with a Bonferroni if appropriate.

The fourth research question addressed satisfaction with each of the transportation areas. Respondents rated their satisfaction with MnDOTs performance on each transportation area and 5.0 was used as the lowest score where respondents were considered satisfied. ANOVA with Tukey's post-hoc test identified differences among the regions when appropriate. For comparisons by age groups, respondents were grouped into age categories based on previous MnDOT work (18-34; 35-59; 60+) and compared with a Bonferroni if appropriate.

The fifth and final research question focused on perceived MnDOT performance compared with perceived importance (satisfaction) of each transportation area. To assess this, importance and performance analysis (I-P) was performed. This is an effective evaluation tool to understand importance and either customer satisfaction with or agency performance on these same attributes (Hendricks, Schneider, and Budruk, 2004). In this case, the attributes were the transportation areas. To conduct I-P analysis, multiple-steps are involved: 1) identify relevant attributes (transportation areas); 2) obtain key market ratings of the importance and performance of each; and 3) develop these ratings in a two-area grid where the vertical axis shows the importance and the horizontal axis shows the satisfaction with the attribute. For example, the attributes placed in the upper right part of the grid demonstrate high importance and high satisfaction, which indicates these attributes are well managed. The attributes with high importance and low satisfaction need more attention while the attributes with low importance and high satisfaction may show overemphasis. In this analysis, we identified relevant transportation areas from the focus group portion of the study (Schroeder et al. 2011), measured Minnesotan's perceived importance and satisfaction with these transportation areas using the questionnaires, and then graphed the mean scores on these items.

Factor analysis examined how quality of life areas related to one another and could be categorized. Oblique factor analysis using eigen values of 1.0 and factor loadings of .4 identified underlying factors.

A high response rate to the questionnaire provided a generally representative sample from which a robust analysis could then investigate the importance of select quality of life areas and the role transportation plays in quality of life. Results of these analyses are presented in the next section.

# Chapter 4
# Results

Analysis of a mail questionnaire to a representative sample of Minnesotans presents data both on 1) how Minnesota residents perceive and evaluate transportation with regards to their quality of life and 2) residents' satisfaction with various transportation components. This project focused on five major research questions related to the relationship of transportation and quality of life, satisfaction with transportation, and the importance of and MnDOT performance on transportation services. Results on the primary research questions are presented followed by a descriptive analysis of the sample.

## 4.1 Response rate

Of the 7,488 mailed questionnaires, 3,484 were returned. Of these, 3,308 were identified as usable as the data were at least 60% complete. Therefore the valid response rate was 45.4% (Table 4.1). The respondents were distributed across the five pre-identified regions as follows: 53.2% Metro, 8.7% Central, 8.3% Northeast, 9.2% Northwest, and 20.6% South, mirroring the state population percentages (Table 4.2).

**Table 4.1**

***Response rate of quality of life and transportation survey, Minnesota, 2011***

| Item | Number/% |
|---|---|
| Mailed questionnaires | 7,488 |
| Undeliverable | 175 |
| Deceased/changed address | 35 |
| Valid total | 7, 278 |
| Returned | |
| Received questionnaires | 3484 |
| Unusable | 176 |
| Valid response | 3308 |
| Valid response rate | 45.4% |

**Table 4.2**

***State population distribution compared to sample representation, Minnesota, 2011***

| | Population Estimate 2009[a] | | Sample | |
|---|---|---|---|---|
| Region | N | % | N | % |
| State | 5,192,122 | 100 | 3308 | 100 |
| Metro | 2,932,301 | 56.5 | 1750 | 53.2 |
| South | 996,762 | 19.2 | 677 | 20.6 |
| Central | 511,961 | 9.9 | 286 | 8.7 |
| Northwest | 449,066 | 8.7 | 304 | 9.2 |
| Northeast | 410,852 | 7.9 | 272 | 8.3 |

*Note.* [a] cited from Minnesota State Demographic Center (2007)

## 4.2. Research questions

4.2.1 If/how does transportation contribute to satisfaction with quality of life among Minnesotans?

Both descriptive and predictive analyses were employed to identify if and how transportation contributes to satisfaction with quality of life among Minnesotans. Simple descriptive analysis indicated each of the eleven quality of life areas was rated as somewhat important to very important. All areas had an average score of at least 6.06 on the seven-point scale, where 7 was very important. The three areas with the highest importance means were health ( $\overline{X}$ =6.84), family, friends and neighbors ( $\overline{X}$ =6.71), and safety and security ( $\overline{X}$ =6.71). Areas lowest on the list were spirituality, faith, and serenity ( $\overline{X}$ =6.10) and recreation and entertainment ( $\overline{X}$ = 6.06; Figure 4.1 and Table 4.3). When respondents identified the three most important areas from the list, those most frequently cited were health (61.0%), family, friends and neighbors (54.6%), and employment and finances (34.5%; Figure 4.2). When comparing mean importance among the life areas, transportation was the ninth most important quality of life factor among the eleven rated. Similarly, when respondents were able to write-in the most important areas to satisfaction with quality of life from the provided list, transportation was the ninth most frequently identified.

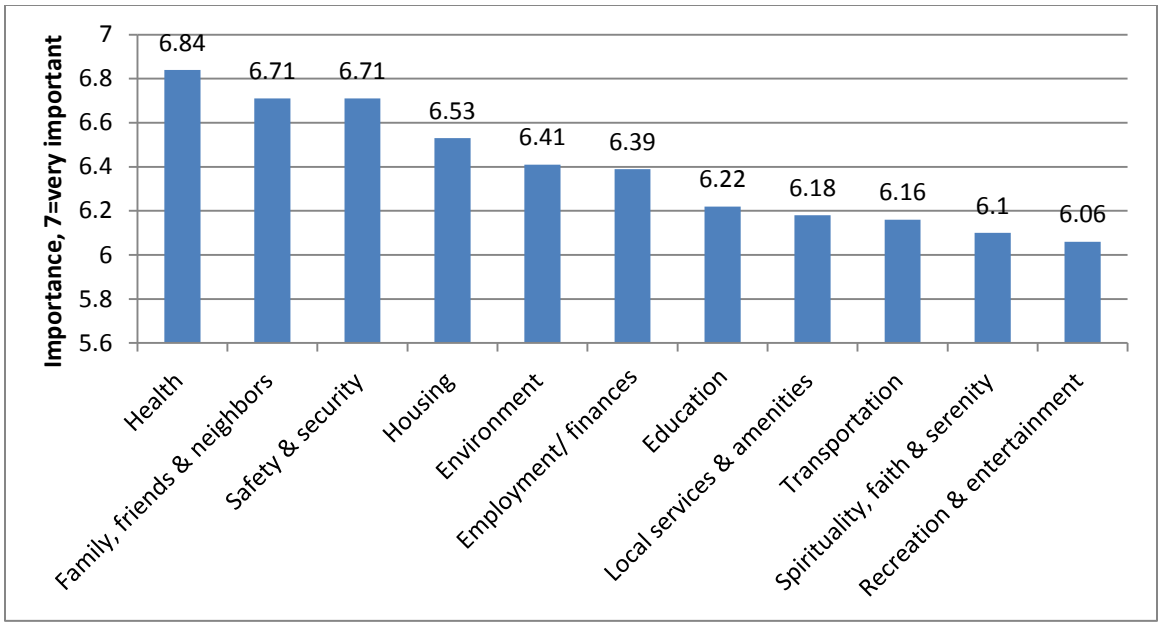


***Figure 4.1.*** **Mean importance of quality of life areas among Minnesotans, 2011.**

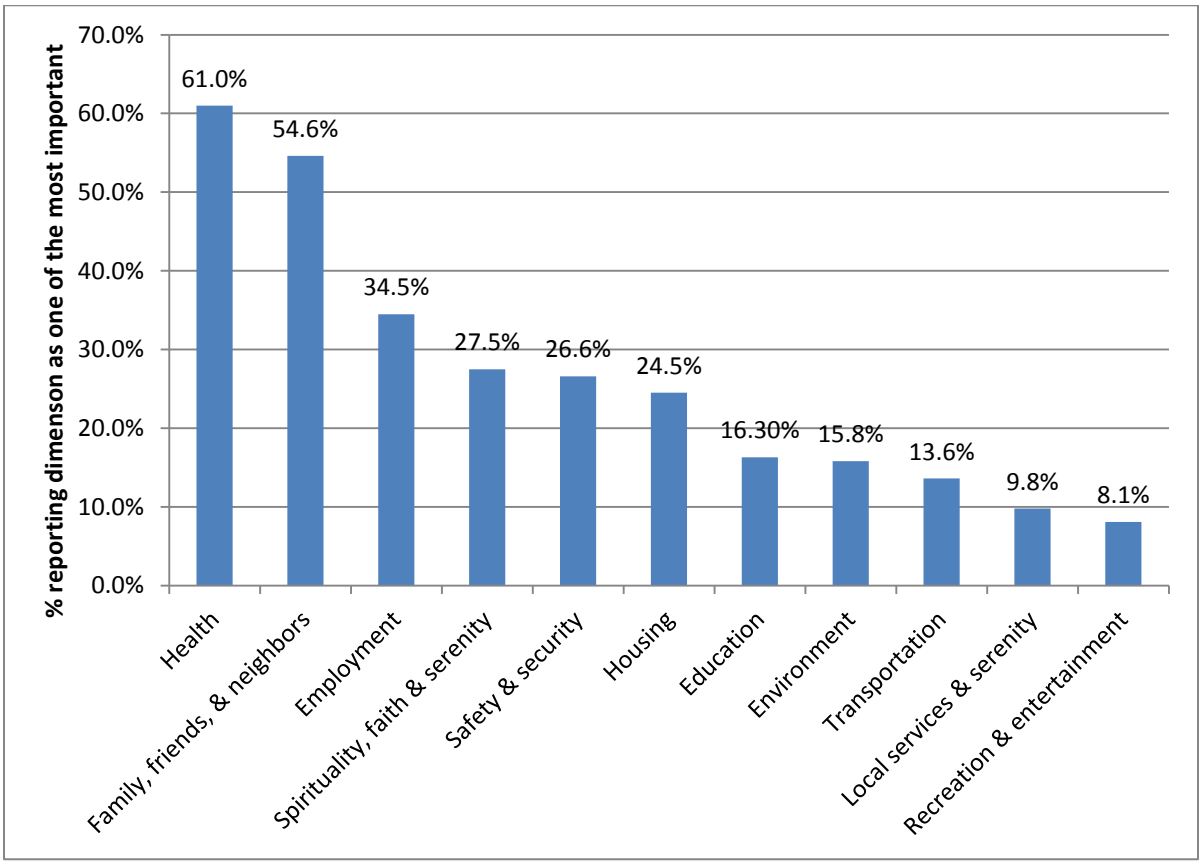


***Figure 4.2.*** **Percent of respondents reporting life area as one of most important.**

**Table 4.3**

***Importance of various quality of life areas among Minnesotans, 2011***

| | State (n=3308) | | Metro (n=1750) | | Central (n=286) | | Northeast (n=272) | | Northwest (n=304) | | South (n=677) | | F statistic |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Life Area | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | |
| Health | 6.84 | 0.57 | 6.84 | 0.61 | 6.87 | 0.51 | 6.85 | 0.52 | 6.88 | 0.38 | 6.81 | 0.61 | 0.96 |
| Family, friends & neighbors | 6.71 | 0.72 | 6.72 | 0.73 | 6.77[a] | 0.58 | 6.60[a] | 0.83 | 6.77 | 0.52 | 6.68 | 0.78 | 2.83* |
| Safety & security | 6.71 | 0.73 | 6.72 | 0.70 | 6.79 | 0.53 | 6.62 | 0.88 | 6.68 | 0.83 | 6.7 | 0.74 | 2.21 |
| Housing | 6.53 | 0.92 | 6.57 | 0.87 | 6.54 | 0.86 | 6.42 | 1.04 | 6.45 | 1.07 | 6.49 | 0.93 | 2.88* |
| Environment | 6.41 | 1.01 | 6.44 | 0.96 | 6.5 | 0.88 | 6.32 | 1.14 | 6.41 | 1.10 | 6.36 | 1.09 | 1.73 |
| Employment/ finances | 6.39 | 1.13 | 6.43[a] | 1.12 | 6.38 | 1.15 | 6.17[ab] | 1.34 | 6.31 | 1.10 | 6.43[b] | 1.05 | 3.39** |
| Education | 6.22 | 1.29 | 6.26[a] | 1.27 | 6.22 | 1.21 | 6.00[a] | 1.43 | 6.25 | 1.36 | 6.26 | 1.25 | 3.34* |
| Local services & amenities | 6.18 | 0.98 | 6.20 | 0.99 | 6.16 | 0.88 | 6.14 | 1.00 | 6.19 | 1.02 | 6.17 | 0.97 | 0.36 |
| Transportation | 6.16 | 1.18 | 6.13 | 1.18 | 6.2 | 1.08 | 6.08 | 1.33 | 6.09 | 1.21 | 6.22 | 1.15 | 1.50 |
| Spirituality, faith & serenity | 6.10 | 1.36 | 5.97[a] | 1.46 | 6.31[ab] | 1.08 | 5.9[bcd] | 1.44 | 6.33[ac] | 1.20 | 6.31[ac] | 1.14 | 13.74*** |
| Recreation & entertainment | 6.06 | 1.06 | 6.10[ab] | 1.06 | 6.04 | 0.91 | 5.90[b] | 1.13 | 5.99 | 1.18 | 6.08[a] | 0.99 | 2.71* |

*Note.* Quality of life scale reliability strong: Cronbach $\alpha = .82$. Means with same superscripts are significantly different.

Importance of various areas to quality of life measured with 7 point scale: 1= Very unimportant; 2= Somewhat unimportant; 3= Slightly unimportant; 4=Neither; 5= Slightly important; 6= Somewhat important; 7= Very important. * p< .05 ** p< .01 ***p<.001

Predictive analysis with stepwise multiple regression revealed significant but low predictive ability of six areas to predict satisfaction with quality of life, depending on statistical method used. The adjusted explained variance was 5% and included health, recreation/entertainment, education, spirituality, housing, and transportation as significant predictors of quality of life (Table 4.4; Figure 4.3). In the analysis, transportation served as a 'suppressor' variable, which enhances the explanatory power of other predictors by suppressing irrelevant variance.

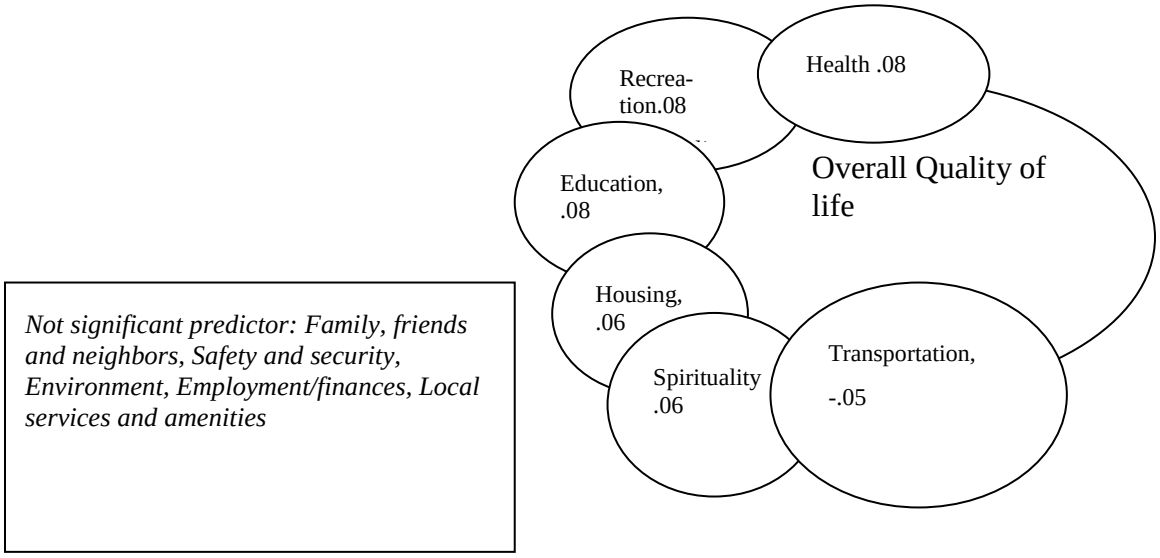


***Figure 4.3.*** **Diagram illustrating relative contribution of various life dimensions to explain overall quality of life among Minnesotans, 2011.**

When predictive models were employed among regional respondents, all regions produced significant models but with low explained variance and inconsistent predictors (Table 4.4). The Metro predictive model included only health, recreation/entertainment, and education. The Central region model included family and health. Both the Northeast and Northwest models had single significant predictors: family and recreation/entertainment, respectively. The model for southern Minnesota residents included safety/security, education, recreation/entertainment and employment/finance.

**Table 4.4**
***Stepwise regression analysis explaining the variance in quality of life among Minnesota residents, 2011***

| Life Areas | State [a] (n=3308) | | Metro [b] (n=1705) | | Central [c] (n=286) | | Northeast [d] (n=272) | | Northwest [e] (n=304) | | South [f] (n=677) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Beta | t-statistic | Beta | t-statistic | Beta | t-statistic | Beta | t-statistic | Beta | t-statistic | Beta | t-statistic |
| Health | .084 | 3.76*** | .127 | 4.36 *** | .142 | 2.10 * | | - | | - | | - |
| Recreation & entertainment | .081 | 3.74*** | .094 | 3.18 ** | | - | | - | .206 | 3.20 ** | .158 | 3.38** |
| Education | .081 | 3.90*** | .070 | 2.47 * | | - | | - | | - | .152 | 3.49** |
| Spirituality, faith & serenity | .059 | 2.96** | | - | | - | | - | | - | | - |
| Housing | .059 | 2.48* | | - | | - | | - | | - | | - |
| Transportation | -.046 | -2.13* | | - | | - | | - | | - | | - |
| Family, friends & neighbors | | - | | - | .165 | 2.44 * | .150 | 2.21 * | | - | | - |
| Safety & security | | - | | - | | - | | - | | - | .166 | 3.45 ** |
| Employment/ finances | | - | | - | | - | | - | | - | -.107 | -2.22 * |

*Note.* [a.] Adjusted R square= .048 (R square = .051), F(2,629)=23.363, p<.01;

[b.] Adjusted R square= .047 (R square = .049), F(1,402)=24.221, p<.01;

[c.] Adjusted R square= .054 (R square = .063), F(228)=7.617, p<.01;

[d.] Adjusted R square= .018 (R square = .022), F(214)=4.900, p<.05;

[e.] Adjusted R square= .038 (R square = .043), F(230)=10.221, p<.01;

[f.] Adjusted R square= .085 (R square = .092), F(530)=13.457, p<.001.

* p< .05, ** p< .01, ***p<.001;Only variable retained in final models

Similarly, when comparing predictive models by age groups, significant models emerged but they had low explained variances and inconsistent predictors (Table 4.5). Specifically, among those 18-34 years of age (n=149), the two significant predictors of satisfaction with quality of life were safety and recreation/entertainment (Adjusted $R^2$ = .104). Among those 35-59 years of age (n= 1460), the four significant predictors were health, education, spirituality/faith/serenity, and transportation (Adjusted $R^2$ = .069). Finally, among those sixty years and older (n=1639), the three significant predictors were recreation/entertainment, education, housing (Adjusted $R^2$ = .045).

**Table 4.5**

***Stepwise regression analysis explaining the variance in quality of life among Minnesota residents of varying age groups, 2011***

| Life Area | Younger Group[a] (18-34) (n=149) | | Middle Group[b] (35-59) (n=1460) | | Older Group[c] (over 60) (n=1639) | |
|---|---|---|---|---|---|---|
| | Beta | t-statistic | Beta | t-statistic | Beta | t-statistic |
| Health | | - | .159 | 5.39*** | | - |
| Recreation & entertainment | .179 | 2.15 * | | - | .111 | 3.65*** |
| Education | | - | .140 | 4.83*** | 2.158 | 2.16 * |
| Spirituality, faith & serenity | | - | .105 | 3.67 *** | - | |
| Housing | | - | | - | .112 | 3.60 *** |
| Transportation | | - | -.060 | -2.07* | | - |
| Safety & security | .275 | 3.30 ** | | - | | - |

*Note.* [a.] Adjusted R square= .104 (R square = .118), F(129)=8.59, p<.01; [b.] Adjusted R square= .069 (R square = .072), F(1229)=23.966, p<.001; c. Adjusted R square= .045(R square = .047), F(1222)=20.240, p<.001;* p< .05, ** p< .01, ***p<.001

When predictive models were employed comparing commuters and non commuters, significant models with low explained variance and inconsistent predictors emerged yet again (Table 4.6). The commuter predictive model included only seven variables: health, recreation, education, spirituality, housing, family and friends, and finally employment and finances. In contrast, the non-commuter included only three: education, recreation, and safety and security.

**Table 4.6**

***Stepwise regression analysis explaining the variance in quality of life for commuters and non-commuters in Minnesota, 2011***

| Life Area | Commuter [a] | | Non-commuter [b] | |
|---|---|---|---|---|
| | Beta | t-statistic | Beta | t-statistic |
| Health | .115 | 3.59*** | | - |
| Recreation & entertainment | .059 | 2.04* | .094 | 2.78** |
| Education | .097 | 3.63*** | .080 | 2.49* |
| Spirituality, faith & serenity | .062 | 2.41* | - | |
| Housing | .063 | 1.99* | - | |
| Safety & security | - | | .071 | 2.14* |
| Family, friends & neighbors | .061 | 1.97* | | |
| Employment and finances | -.097 | -3.44** | - | |

*Note.* a. Adjusted R square= .073 (R square = .077), F(1553)=18.62, p<.01;

b. Adjusted R square= 0.030 (R square = 0.032), F(1,041)=11.66, p<.01;

* p< .05 ** p< .01 ***p<.001

Only variables retained in final models

Similarly low predictive capabilities emerged when considering only people with disabilities (Table 4.7). Employment and finances was the sole predictor for the model and it explained only 4% of the variance in quality of life.

**Table 4.7**

***Stepwise regression analysis explaining the variance in quality of life among people with disabilities in Minnesota, 2011***

| | Model | |
|---|---|---|
| Life Area | Beta | t-statistic |
| Employment and finances | .206 | 3.46** |

*Note*. Adjusted R square= .039 (R square = .042), F(271)=11.95, p<.01; Only variable retained in final models; * p< .05 ** p< .01, ***p<.001

4.2.2 If/how does satisfaction with each transportation area contribute to satisfaction with transportation overall?

Predictive analysis with stepwise multiple regression revealed significant predictive ability of transportation areas to predict satisfaction with MnDOT services overall. Using the single item "satisfaction with MnDOT overall" (Question 19), the adjusted explained variance is 55%. Using stepwise/model building analysis, all transportation areas are significant (in order) except environment: maintenance, long term planning, accessibility, design, safety, communications and mobility (Table 4.8; Figure 4.4). This model also held for commuters (Table 4.9). However, when examining the model for people with disabilities, mobility, maintenance, and environment were not included in the final model (Table 4.10).

**Table 4.8**

***Stepwise regression analysis explaining satisfaction with MnDOT services, 2011***

| Transportation Areas | Model | |
|---|---|---|
| | Beta | t-statistic |
| Maintenance | .268 | 14.67*** |
| Planning | .166 | 10.16*** |
| Accessibility | .133 | 6.91*** |
| Design | .132 | 7.03*** |
| Safety | .113 | 5.96*** |
| Communications | .111 | 6.87*** |
| Mobility | .044 | 2.05* |

*Note.* [a.] Adjusted R square= .553 (R square = .555), F(2,874)=511.07, p<.001;

*; p< .05 **; p< .01 ***p<.001

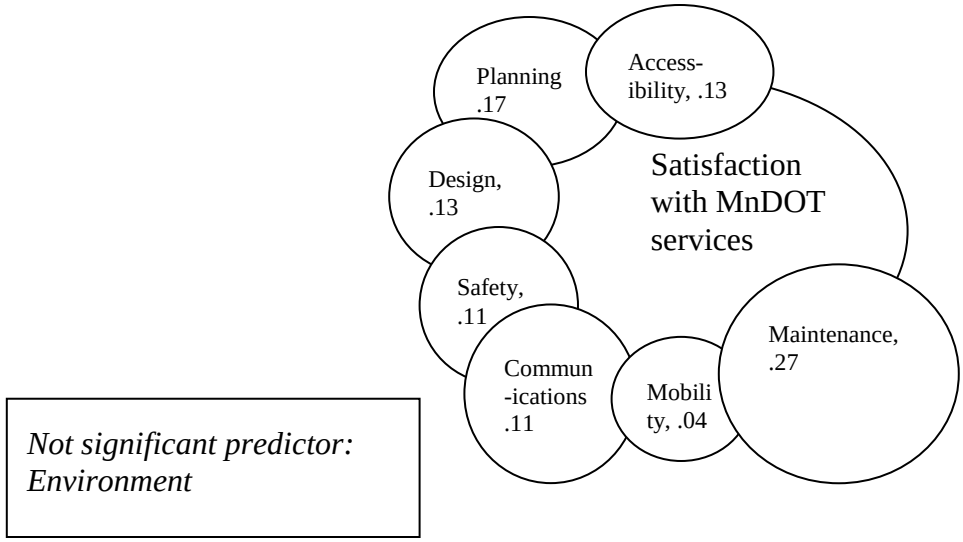


***Figure 4.4.*** **Diagram illustrating relative contribution of various transportation areas to explain satisfaction with MnDOT services among Minnesotans, 2011.**

**Table 4.9**
***Stepwise regression analysis explaining commuter satisfaction with MnDOT services, 2011***

| | Model | |
|---|---|---|
| Transportation area | Beta | t-statistic |
| Maintenance | .250 | 10.80*** |
| Planning | .179 | 8.58*** |
| Design | .154 | 6.39*** |
| Accessibility | .126 | 5.06*** |
| Communications | .119 | 5.76*** |
| Safety | .089 | 3.66*** |
| Mobility | .071 | 2.61** |

*Note.* [a.] Adjusted R square= .569 (R square = .571), F(1,666)=316.45, p<.001;

*; p< .05 **; p< .01 ***p<.001

**Table 4.10**
***Stepwise regression analysis explaining satisfaction with MnDOT services among people with disabilities, 2011***

| | Model | |
|---|---|---|
| Transportation Area | Beta | t-statistic |
| Planning | .236 | 4.14*** |
| Safety | .214 | 3.90*** |
| Accessibility | .165 | 3.12** |
| Design | .139 | 2.40* |
| Communications | .137 | 2.30* |

*Note*. [a.] Dependent variable Adjusted R square= .481 (R square = .490), F(296)=56.77, p<.001;

* p< .05 ** p< .01 ***p<.001

4.2.3 How important is each transportation area?

Descriptive analysis identified the importance of transportation areas overall. Using a cutoff of 5.0 where 7 = very important, all transportation areas were identified as important among respondents. In rank order, the importance was as follows: accessibility ( $\overline{X}$ =6.79), safety ( $\overline{X}$ =6.72), maintenance ( $\overline{X}$ =6.64), mobility ( $\overline{X}$ =6.57), design ( $\overline{X}$ =6.36), long-term planning ( $\overline{X}$ =6.15), environment ( $\overline{X}$ =5.77), and transparency ( $\overline{X}$ =5.60; Table 4.11; Figure 4.5). When given the opportunity to write in their choices for the most important areas, respondents identified (in order), access, maintenance, mobility and safety (mirroring quantitative results; Figure 4.5).

With one exception, respondents in the five pre-identified regions of Minnesota rated the importance of the transportation areas the same (Table 4.11; Figure 4.6). Accessibility was rated as the most important transportation area by all regions and communications was rated as the least important transportation area by all regions. Of the eight transportation areas, only communications' importance was significantly different among regions (F=4.01, p= .003) where respondents from the South indicated communication was more important ( $\overline{X}$ =5.74) than those in the Metro ( $\overline{X}$ =5.54). Although statistically significant, the meaningfulness of this difference is debatable due to the small difference in means.

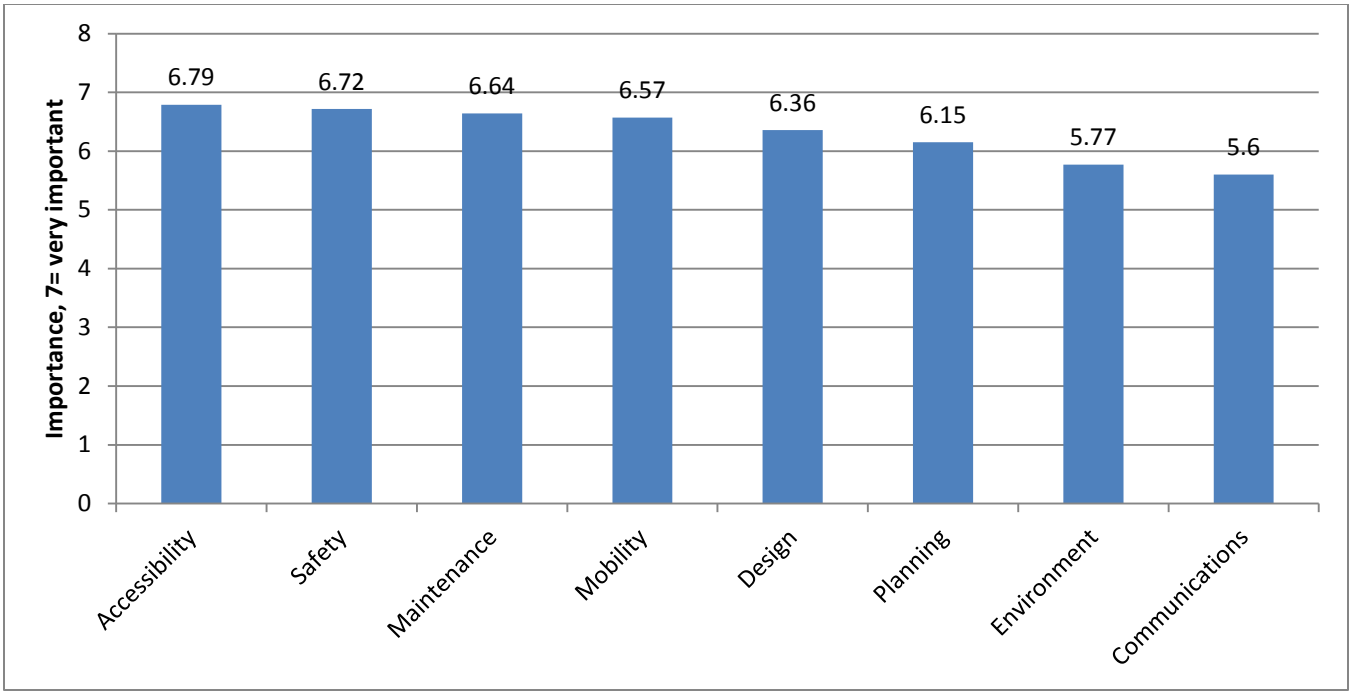


***Figure 4.5.*** **Importance of transportation areas among Minnesota residents, 2011.**

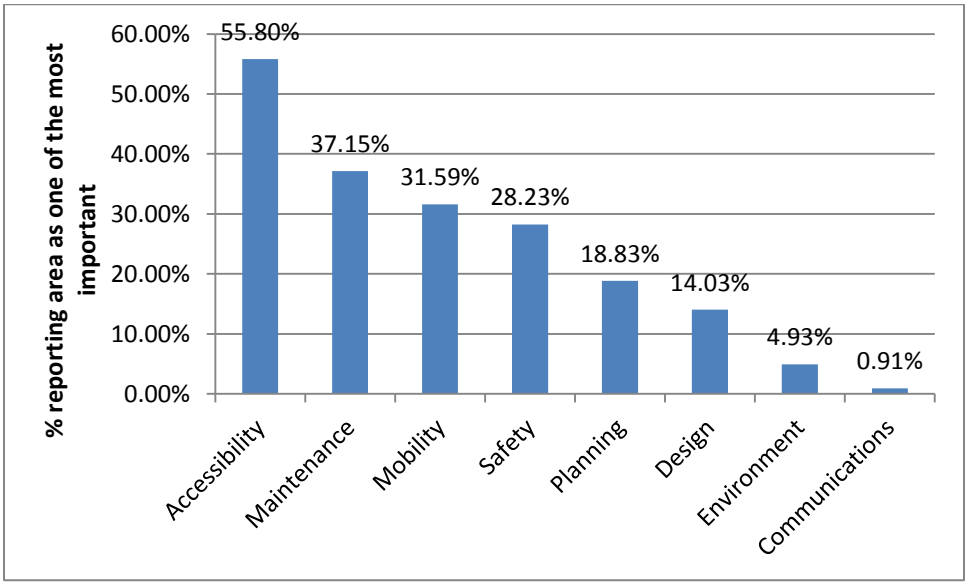


***Figure 4.6.*** **Qualitative assessment of most important transportation areas in Minnesota, 2011.**

**Table 4.11**

***Importance of transportation areas among Minnesota residents, 2011***

| Transportation Area | State (n=3215) | | Metro (n=1710) | | Central (n=280) | | Northeast (n=263) | | Northwest (n=294) | | South (n=652) | | F Statistic |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean[1] | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | |
| Accessibility | 6.78 | 0.61 | 6.79 | 0.61 | 6.81 | 0.57 | 6.79 | 0.69 | 6.78 | 0.61 | 6.76 | 0.55 | 0.37 |
| Safety | 6.72 | 0.67 | 6.71 | 0.70 | 6.72 | 0.64 | 6.76 | 0.65 | 6.72 | 0.71 | 6.73 | 0.58 | 0.37 |
| Maintenance | 6.63 | 0.71 | 6.63 | 0.71 | 6.59 | 0.69 | 6.73 | 0.64 | 6.67 | 0.80 | 6.66 | 0.63 | 1.59 |
| Mobility | 6.56 | 0.72 | 6.58 | 0.70 | 6.59 | 0.70 | 6.51 | 0.85 | 6.60 | 0.71 | 6.54 | 0.70 | 0.92 |
| Design | 6.36 | 0.89 | 6.34 | 0.91 | 6.37 | 0.84 | 6.37 | 0.93 | 6.40 | 0.91 | 6.40 | 0.79 | 0.66 |
| Planning | 6.13 | 1.17 | 6.19 | 1.13 | 6.11 | 1.14 | 6.15 | 1.18 | 6.02 | 1.19 | 6.13 | 1.14 | 1.69 |
| Environment | 5.76 | 1.34 | 5.77 | 1.37 | 5.81 | 1.28 | 5.84 | 1.32 | 5.79 | 1.27 | 5.76 | 1.28 | 0.26 |
| Communications | 5.60 | 1.29 | 5.54[a] | 1.29 | 5.55 | 1.27 | 5.58 | 1.36 | 5.76 | 1.31 | 5.74[a] | 1.20 | 4.01** |

*Note:* Importance of transportation areas measured with 7 point scale: 1= Very unimportant; 2= Somewhat unimportant; 3= Slightly unimportant; 4=Neither; 5= Slightly important; 6= Somewhat important; 7= Very important.

p<.01, * p< .05 , ***p<.001

Means with same superscripts are significantly different.

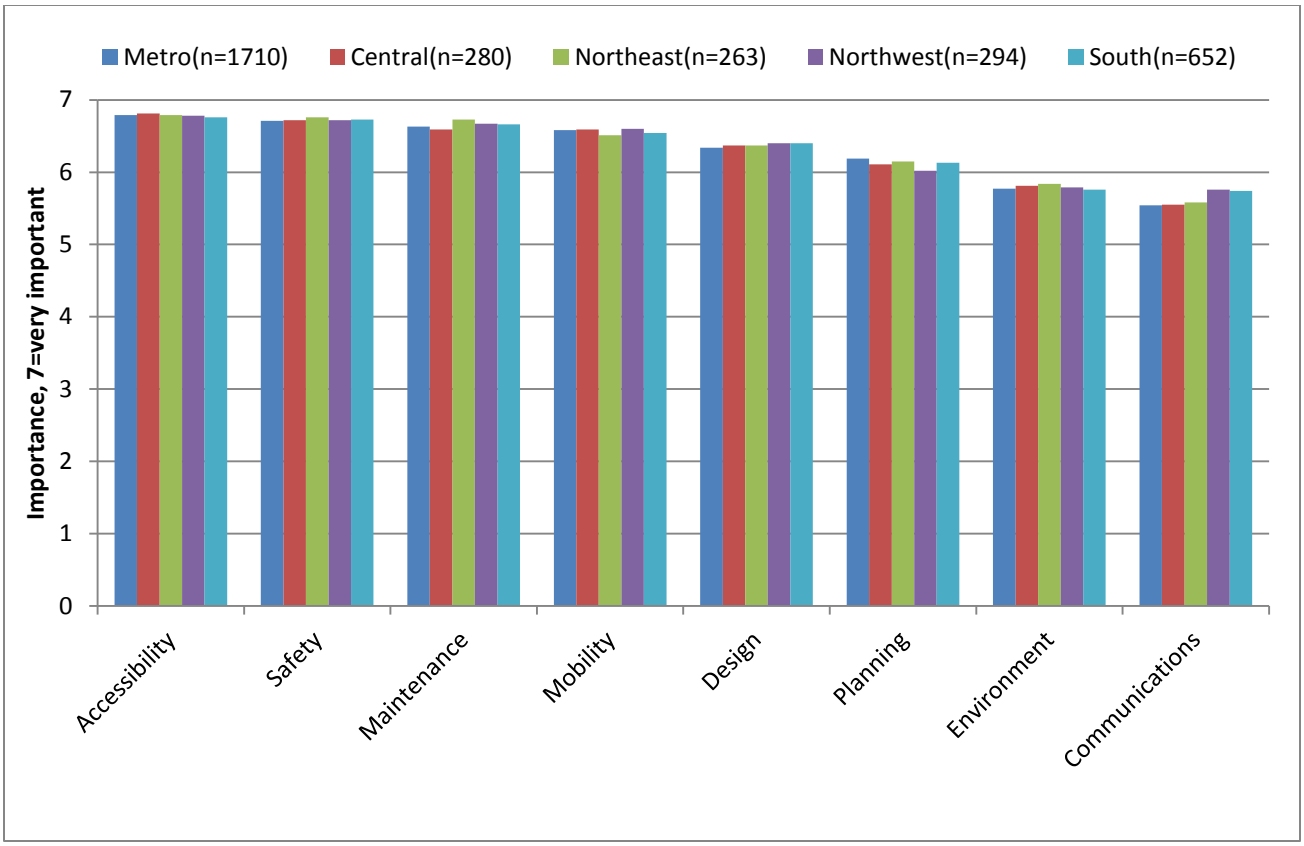


***Figure 4.7.*** **Importance of transportation areas by region, Minnesota 2011.**

In contrast, respondents in different age groups had significantly different perceptions on the importance of about half of the transportation areas (Table 4.12; Figure 4.7). Specifically, younger, middle and older aged groups showed statistically significant differences in their perceived importance of four transportation areas: mobility (F=6.54, p=.001), design (F=35.09, p=.000), transparency (F=27.86, p=.000), and environment (F=3.65, p=.026). Overall, the older group attributed more importance to these four areas than the other groups: the older aged group rated design and communications significantly more important than both the younger and middle-aged groups but attributed significantly higher importance to mobility and environment than only the middle-aged group. The middle aged group attributed greater importance to design than did the younger aged group.

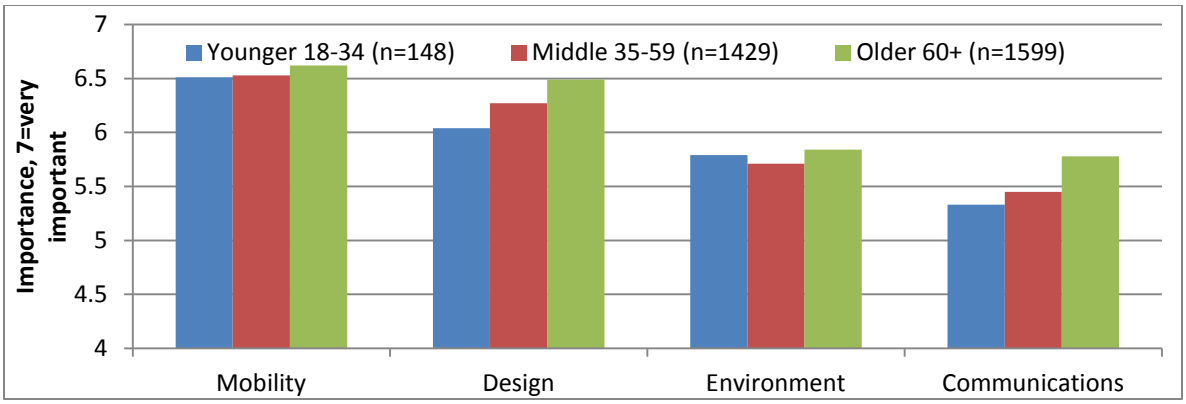


***Figure 4.8.*** **Differences in importance of transportation areas by age groups in Minnesota 2011.**

**Table 4.12**

***Analysis of variance comparing importance of transportation areas among age groups, 2011***

| | Younger 18-34 (n=148) | | Middle 35-59 (n=1429) | | Older 60+ (n=1599) | | F Statistic |
|---|---|---|---|---|---|---|---|
| | Mean[1] | SD | Mean | SD | Mean | SD | |
| Accessibility | 6.78 | 0.58 | 6.77 | 0.61 | 6.81 | 0.58 | 1.19 |
| Safety | 6.71 | 0.63 | 6.70 | 0.70 | 6.75 | 0.64 | 2.06 |
| Maintenance | 6.57 | 0.64 | 6.63 | 0.69 | 6.66 | 0.71 | 1.52 |
| Mobility | 6.51 | 0.71 | 6.53[a] | 0.73 | 6.62[a] | 0.69 | 6.54 ** |
| Design | 6.04[ab] | 1.03 | 6.27[ac] | 0.91 | 6.49[bc] | 0.83 | 35.09 *** |
| Planning | 6.12 | 1.16 | 6.19 | 1.12 | 6.13 | 1.17 | 1.69 |
| Environment | 5.79 | 1.34 | 5.71[a] | 1.37 | 5.84[a] | 1.30 | 3.65 * |
| Communications | 5.33[a] | 1.34 | 5.45[b] | 1.33 | 5.78[ab] | 1.22 | 27.86 *** |

*Note*. Importance of transportation areas measured with 7-point scale: 1=Very unimportant; 2=Somewhat unimportant; 3= Slightly unimportant; 4=Neither; 5= Slightly important; 6= Somewhat important; 7= Very important. * p<.05, * * p< .01 ***p<.001.Means with same superscripts are significantly different.

When comparing commuters and non-commuters, four differences in the importance of transportation areas arose. Specifically, commuters identified planning as more important than non-commuters. However, non-commuters attributed greater importance to communications, design and the environment (Table. 4.13).

**Table 4.13**

***Differences in importance of transportation areas between commuters and non-commuters in Minnesota, 2011***

| Transportation areas | Commuter (n=1806) | | Non-commuter (n=1353) | | t-statistic |
|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | |
| Accessibility | 6.79 | 0.60 | 6.79 | 0.60 | 0.07 |
| Safety | 6.71 | 0.68 | 6.74 | 0.64 | 1.57 |
| Maintenance | 6.63 | 0.70 | 6.65 | 0.71 | 1.07 |
| Mobility | 6.55 | 0.71 | 6.60 | 0.72 | 1.91 |
| Design | 6.30 | 0.90 | 6.45 | 0.86 | 4.83*** |
| Planning | 6.19 | 1.14 | 6.09 | 1.17 | -2.36* |
| Environment | 5.71 | 1.37 | 5.85 | 1.29 | 2.85** |
| Communications | 5.48 | 1.33 | 5.74 | 1.22 | 5.60*** |

*Note*. Importance of transportation areas measured with 7-point scale: 1=Very unimportant; 2=Somewhat unimportant; 3=Slightly unimportant; 4=Neither; 5=Slightly important; 6=Somewhat important; 7=Very important. * p<.05, * * p< .01 ***p<.001

4.2.4 How satisfied are Minnesota residents with MnDOT's performance on each transportation area?

Descriptive analysis identified respondent satisfaction with MnDOT performance on each transportation area overall. Using a cutoff of 5.0 on the 7-point scale, MnDOTs performance on six of the eight areas assessed were ranked as satisfactory (Table 4.14; Figure 4.8). Maintenance and planning were below the 5.0 level (4.89 and 4.63, respectively). In rank order, satisfaction with MnDOT performance on the transportation areas is as follows: accessibility ( $\overline{X}$ =6.09), followed by mobility ( $\overline{X}$ =5.84), design ( $\overline{X}$ =5.79), safety ( $\overline{X}$ =5.53), communications ( $\overline{X}$ =5.13), environment ( $\overline{X}$ =5.05), maintenance ( $\overline{X}$ =4.89) and planning ( $\overline{X}$ =4.63).

**Table 4.14**

***Satisfaction with transportation areas among Minnesota residents, 2011***

| | State (n=3215) | | Metro (M) (n=1710) | | Central (C) (n=280) | | Northeast (NE) (n=263) | | Northwest (NW) (n=294) | | South (S) (n=652) | | F statistic | Regional Difference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | | |
| Accessibility | 6.09 | 1.10 | 6.07 | 1.07 | 6.01 | 1.22 | 6.16 | 1.01 | 6.18 | 1.13 | 6.14 | 1.08 | 1.65 | No diff. |
| Mobility | 5.84 | 1.23 | 5.76 | 1.26 | 5.72 | 1.28 | 5.99 | 1.05 | 6.02 | 1.21 | 5.97 | 1.13 | 6.82*** | M < NE, NW & S; C < NW & S |
| Design | 5.79 | 1.23 | 5.73 | 1.26 | 5.67 | 1.28 | 5.96 | 0.97 | 5.96 | 1.21 | 5.89 | 1.16 | 5.48*** | M > all; C < NE/NW; |
| Safety | 5.53 | 1.39 | 5.49 | 1.38 | 5.41 | 1.41 | 5.55 | 1.34 | 5.79 | 1.31 | 5.58 | 1.44 | 3.48** | NW > M & C |
| Communications | 5.13 | 1.32 | 5.08 | 1.32 | 5.04 | 1.32 | 5.09 | 1.25 | 5.28 | 1.37 | 5.25 | 1.31 | 3.16* | S > M |
| Environment | 5.05 | 1.34 | 4.96 | 1.35 | 5.07 | 1.31 | 5.11 | 1.31 | 5.22 | 1.33 | 5.17 | 1.30 | 4.42** | M < NW & S |
| Maintenance | 4.89 | 1.75 | 4.77 | 1.78 | 4.85 | 1.69 | 4.84 | 1.76 | 5.41 | 1.55 | 5.01 | 1.73 | 9.49*** | NW > all; S > M |
| Planning | 4.63 | 1.62 | 4.49 | 1.67 | 4.61 | 1.62 | 4.75 | 1.43 | 4.96 | 1.55 | 4.84 | 1.54 | 9.38*** | NW > M & C; C > M |

*Note*. Satisfaction of transportation area measured with 7-point scale: 1=Very dissatisfied; 2=Somewhat dissatisfied; 3=Slightly dissatisfied; 4=Neither; 5=Slightly satisfied; 6=Somewhat satisfied; 7=Very satisfied. b. ANOVA was conducted to identify the importance differences among regions; * p< .05 ** p< .01 ***p<.001

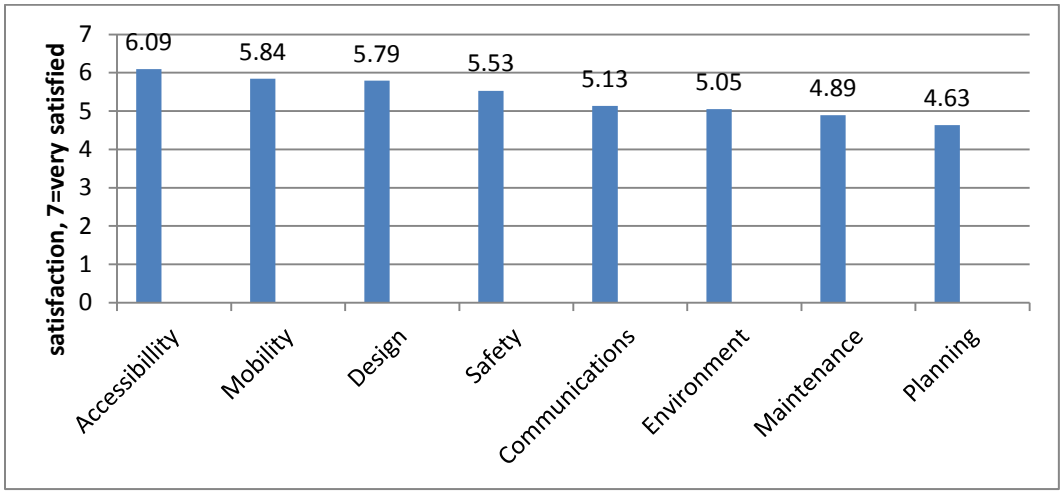


***Figure 4.9.*** **Satisfaction with transportation areas among Minnesota residents, 2011.**

Satisfaction with accessibility was the only factor that did not differ among regions. Satisfaction significantly differed by region across the other seven areas: mobility (F=6.82, p=.000), design (F=5.48, p=.000), safety (F=3.48, p=.008), communications (F=3.16, p=.013), environment (F=4.42, p=.001), maintenance (F=9.49, p=.000), and planning (F=9.38, p=.000). The metro area had lower satisfaction on most items than other regions (Table 4.14; Figure 4.9). *Design* Residents from the metro area had significantly lower satisfaction with design ($\overline{X}$ =5.73) than those from the northeast ($\overline{X}$ =5.96), the northwest ($\overline{X}$ =5.96) and the south ($\overline{X}$ =5.89). Residents from the central area were significantly less satisfied with design than those from northeast and northwest ($\overline{X}$ =5.67 vs $\overline{X}$ =5.96). *Mobility* Residents from the northeast ($\overline{X}$ =5.99), the northwest ($\overline{X}$ =6.02), and the south ($\overline{X}$ =5.97) were significantly more satisfied with their mobility than residents in the metro area ($\overline{X}$ =5.76). Residents from northeast and northwest were also significantly more satisfied then residents in central area ($\overline{X}$ =5.72). *Maintenance* Residents from the northwest ($\overline{X}$ =5.41) were significantly more satisfied than all other four regions, metro ($\overline{X}$ =4.77), central ($\overline{X}$ =4.85), northeast ($\overline{X}$ =4.84), and south ($\overline{X}$ =5.01). Residents from the south were significantly more satisfied with maintenance than those from the metro. *Safety* Safety was rated significantly higher in the northwest ($\overline{X}$ =5.79) than in the metro ($\overline{X}$ =5.49) and the central ($\overline{X}$ =5.41). *Communication* Residents from the south ($\overline{X}$ =5.25) were significantly more satisfied with transparency than residents from the metro ($\overline{X}$ =5.08). *Environment* Residents from the northwest ($\overline{X}$ =5.22) and the south ($\overline{X}$ =5.17) were significantly more satisfied with environment than residents from the metro ($\overline{X}$ =4.96). *Planning* Planning was rated significantly higher in the northwest ($\overline{X}$ =4.96) and in the south ($\overline{X}$ =4.84) than in the metro ($\overline{X}$ =4.49).

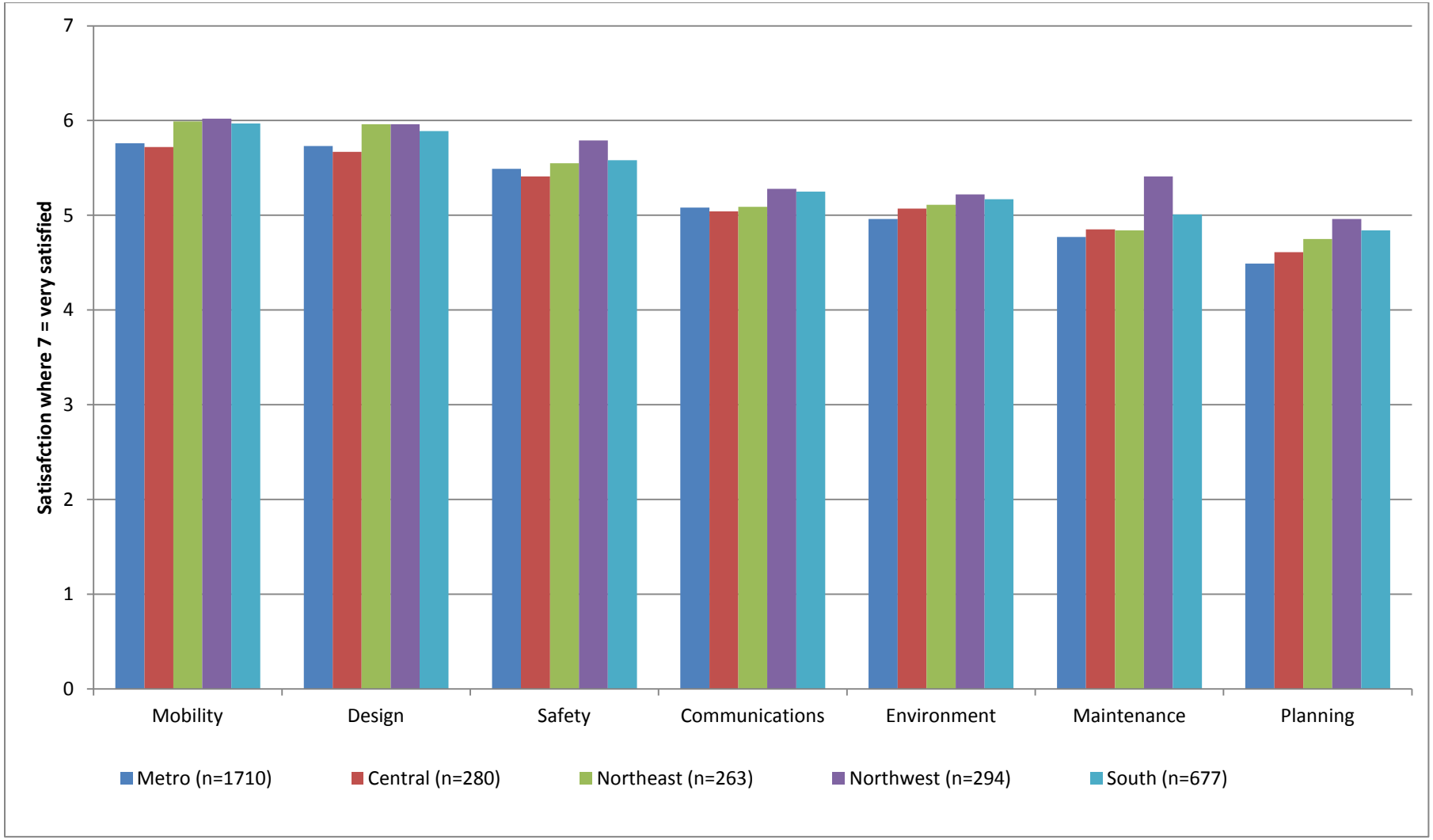


***Figure 4.10.*** **Differences in satisfaction with transportation areas by regional residence among Minnesotans, 2011.**

Respondents in different age groups had significantly different satisfaction assessments with MnDOT performance on all of the transportation areas (Table 4.15; Figure 4.10). In particular, the older aged group reported significantly higher satisfaction with all eight transportation areas than the younger and middle aged group.

**Table 4.15**

***Satisfaction with transportation areas among different age groups in Minnesota, 2011***

| | Younger 18-34 (n=148) | | Middle 35-39 (n=1429) | | Older 60+ (n=1599) | | F statistic |
|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | |
| Accessibility | 5.95[a] | 1.10 | 5.99[b] | 1.16 | 6.22[ab] | 1.02 | 17.62*** |
| Mobility | 5.52[a] | 1.28 | 5.67[b] | 1.30 | 6.04[ab] | 1.11 | 40.41*** |
| Design | 5.51[a] | 1.24 | 5.63[b] | 1.29 | 5.98[ab] | 1.12 | 36.22*** |
| Safety | 5.21[a] | 1.49 | 5.37[b] | 1.44 | 5.72[ab] | 1.31 | 27.66*** |
| Communications | 4.93[a] | 1.25 | 4.96[b] | 1.36 | 5.32[ab] | 1.28 | 30.13*** |
| Environment | 4.82[a] | 1.35 | 4.87[b] | 1.35 | 5.24[ab] | 1.31 | 30.91*** |
| Maintenance | 4.25[a] | 1.77 | 4.57[b] | 1.79 | 5.24[ab] | 1.64 | 67.66*** |
| Planning | 4.39[a] | 1.59 | 4.33[b] | 1.63 | 4.94[ab] | 1.56 | 55.09*** |

*Note*. Satisfaction of transportation areas measured with 7-point scale: 1=Very dissatisfied; 2=Somewhat dissatisfied; 3=Slightly dissatisfied; 4=Neither; 5=Slightly satisfied; 6=Somewhat satisfied; 7=Very satisfied. * p<.05, * * p< .01 ***p<.001 Means with same superscripts are significantly different.

Commuters and non-commuters reported significantly different satisfaction with all transportation areas. Non-commuters rated all transportation areas as more satisfactory than commuters.

**Table 4.16**

***Differences in satisfaction with transportation areas between commuters and non-commuters in Minnesota, 2011***

| | Commuter (n=1806) | | Non-commuter (n=1353) | | t-statistic |
|---|---|---|---|---|---|
| | Mean[1] | SD | Mean | SD | |
| Accessibility | 6.02 | 1.14 | 6.18 | 1.04 | -4.04*** |
| Mobility | 5.71 | 1.29 | 6.00 | 1.23 | -6.72*** |
| Design | 5.67 | 1.28 | 5.95 | 1.12 | -6.37*** |
| Safety | 5.42 | 1.44 | 5.67 | 1.32 | -5.01*** |
| Communications | 5.00 | 1.35 | 5.31 | 1.25 | -6.44*** |
| Maintenance | 4.94 | 1.33 | 5.21 | 1.66 | -9.32*** |
| Environment | 4.63 | 1.78 | 5.19 | 1.33 | -5.34*** |
| Planning | 4.41 | 1.63 | 4.91 | 1.56 | -8.46*** |

*Note*. Satisfaction of transportation areas measured with 7-point scale: 1=Very dissatisfied; 2=Somewhat dissatisfied; 3=Slightly dissatisfied; 4=Neither; 5=Slightly satisfied; 6=Somewhat satisfied; 7=Very satisfied. * p<.05, * * p< .01 ***p<.001

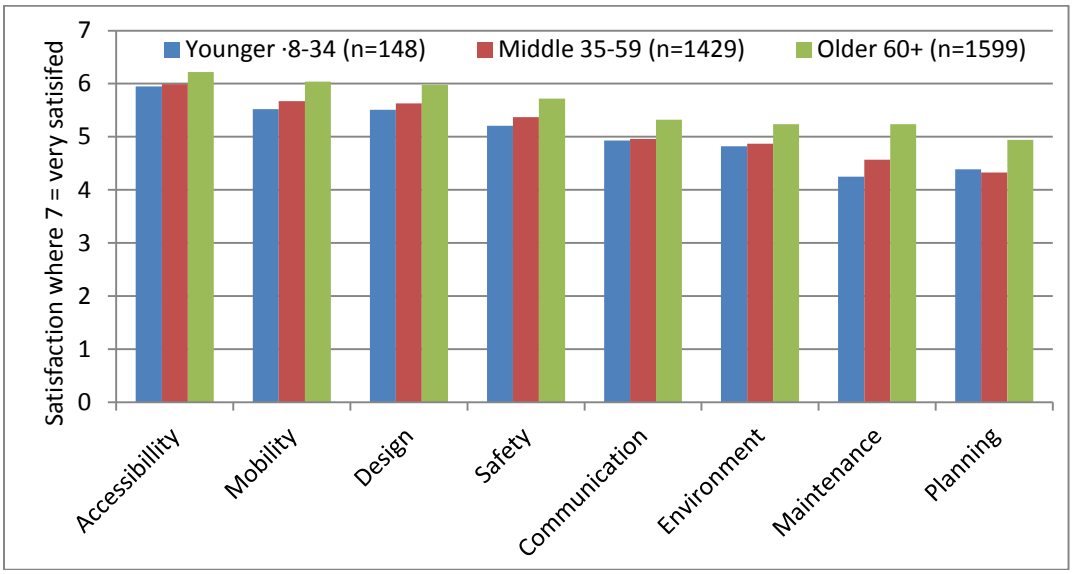


***Figure 4.11.*** **Differences in satisfaction with transportation areas by age group among Minnesota residents, 2011.**

*4.2.5:* How does perceived MnDOT performance compare with perceived importance on each transportation area?

Of the eight transportation areas, four were rated high both in importance and in satisfaction; accessibility, safety, mobility, and design (Figure 4.11). Maintenance was rated high in importance, yet relatively lower in satisfaction. Transparency and environment were rated relatively low in both importance and satisfaction.

This pattern of importance-performance was repeated in each region where the areas were in the same quadrants, but in slightly different locations within the quadrants (Figures 4.12-16). Similarly, with one exception, the pattern of perceived importance-performance was repeated among respondents in three age groups. However, design fell into the lower satisfaction quadrant for both younger and middle-aged respondents (Figures 4.17 to 4.19).

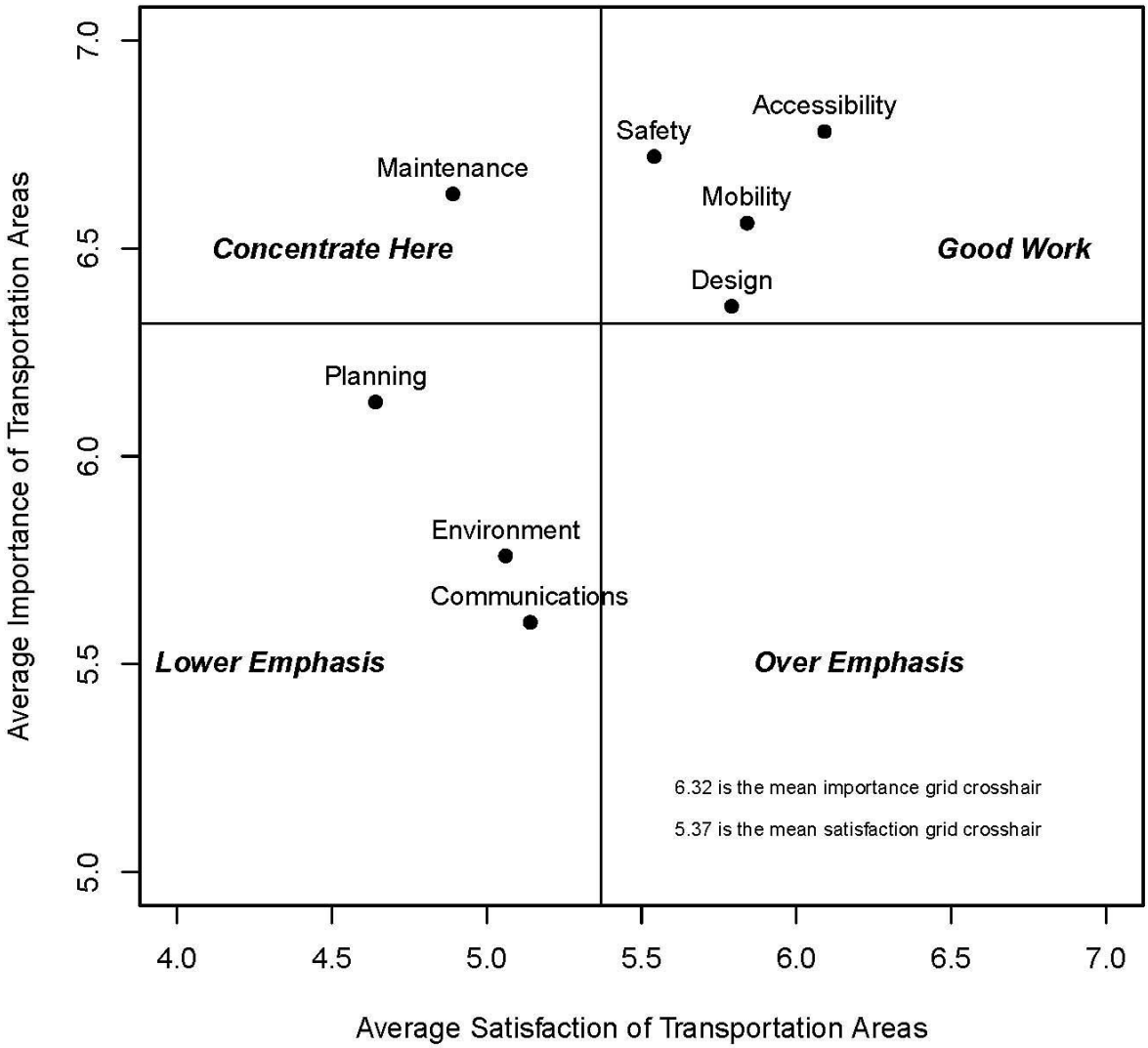


***Figure 4.12*. Importance and performance analysis plot of transportation areas among Minnesota residents, 2011.**

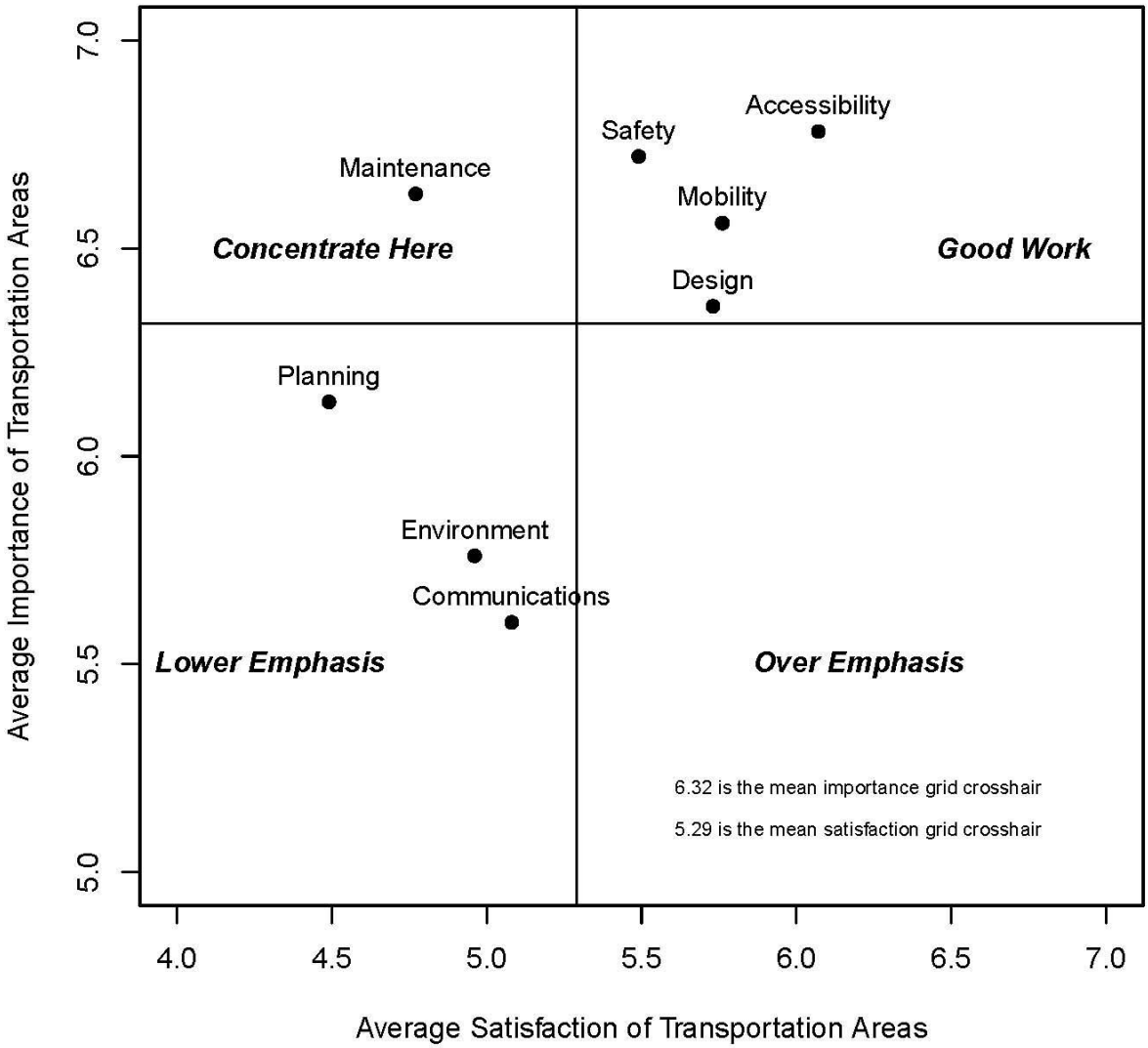


***Figure 4.13.*** **Importance and performance analysis for transportation areas in metro Minnesota, 2011.**

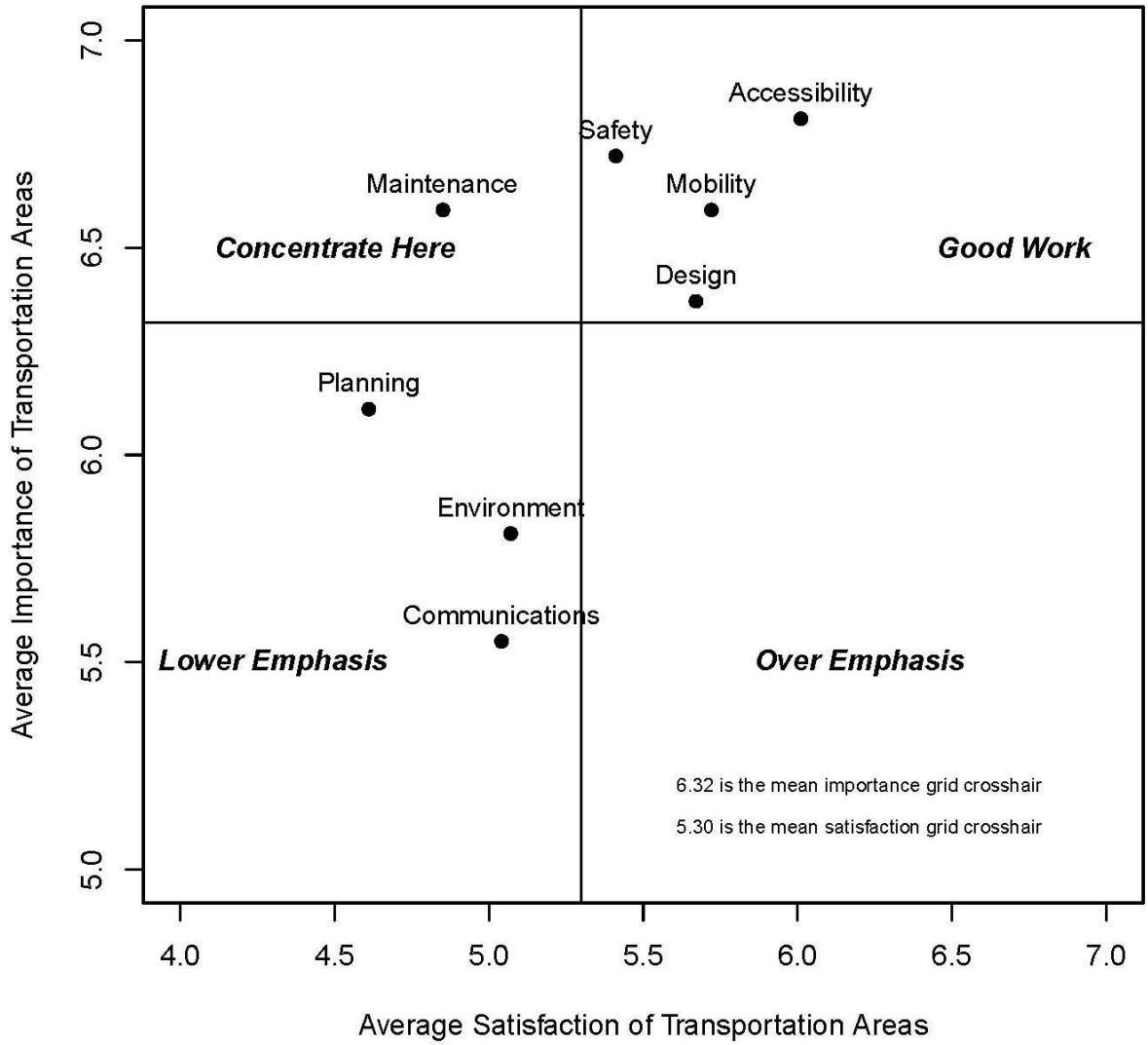


***Figure 4.14.*** **Importance and performance analysis for transportation areas in central Minnesota, 2011.**

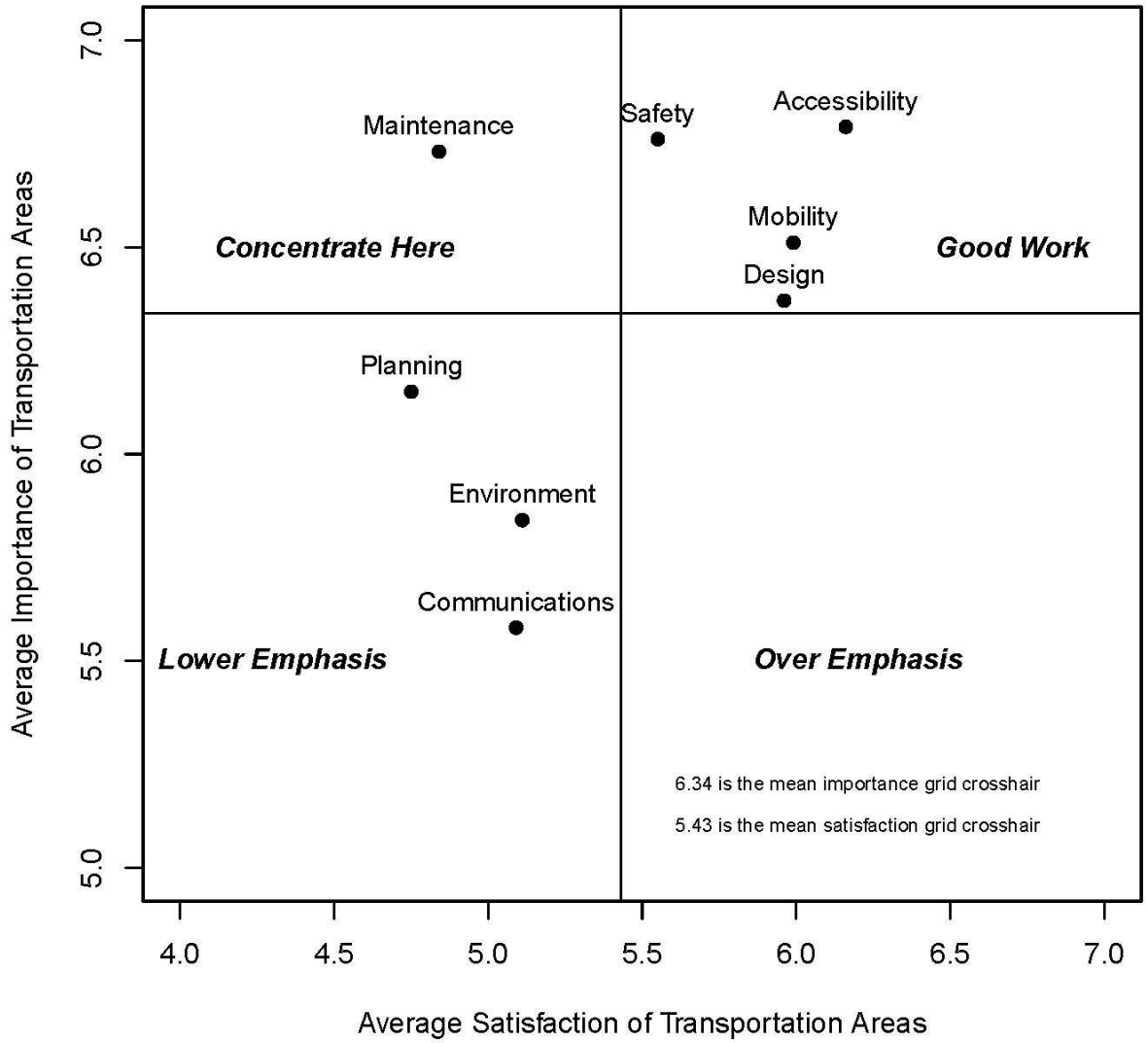


***Figure 4.15.*** **Importance and performance analysis for transportation areas in northeast Minnesota, 2011.**

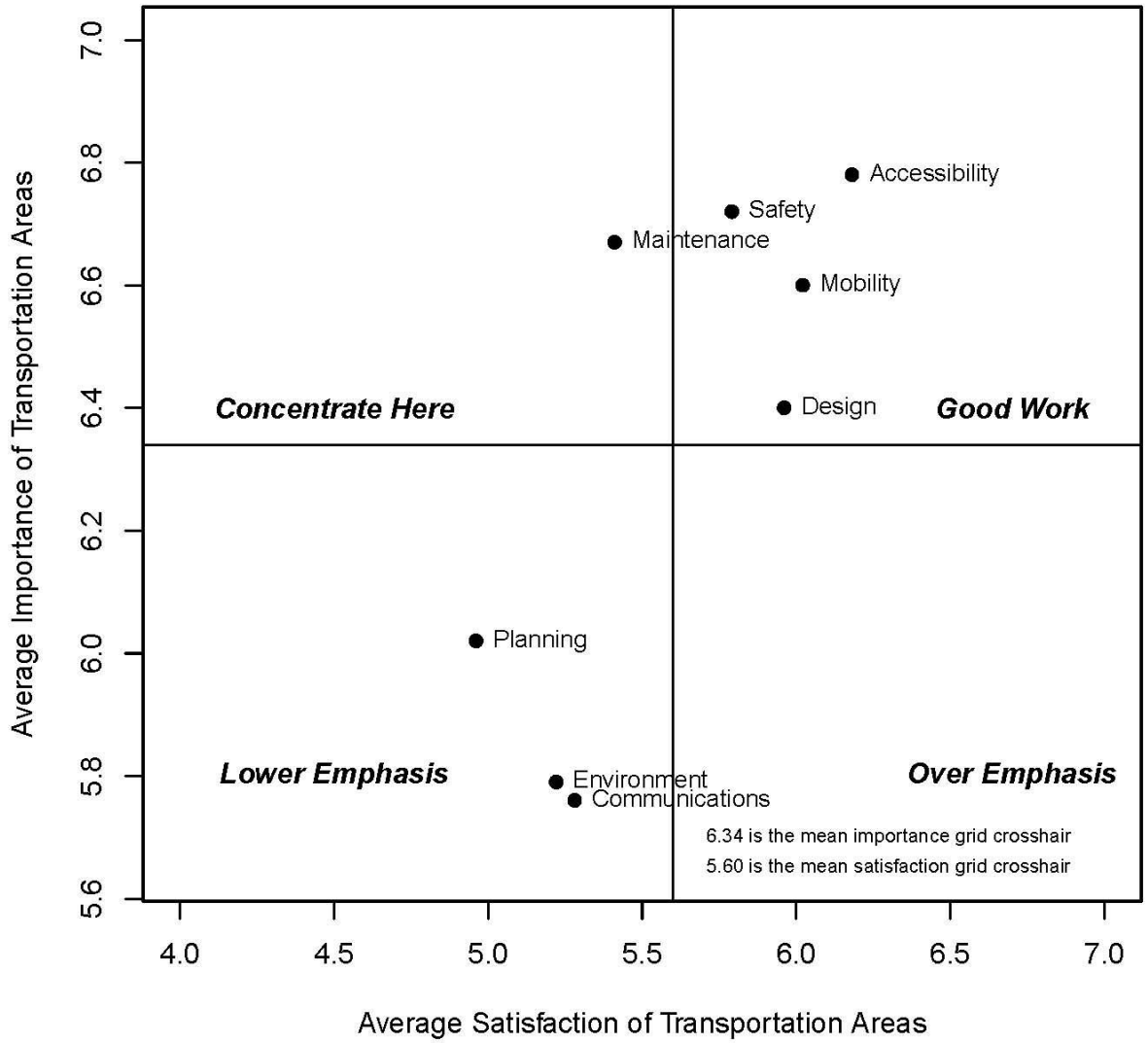


***Figure 4.16.*** **Importance and performance analysis for transportation areas in northwest Minnesota, 2011.**

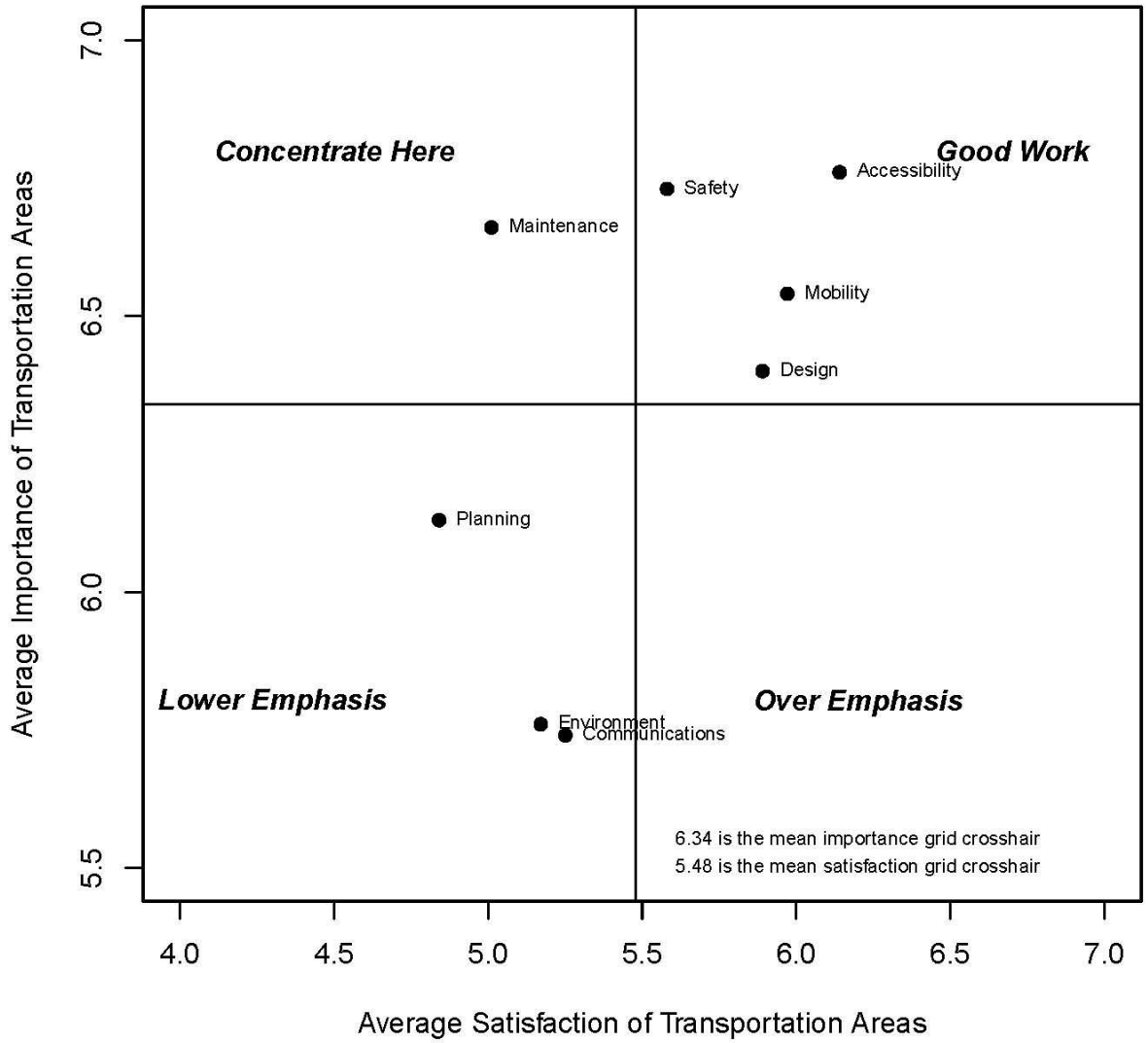


***Figure 4.17.*** **Importance and performance analysis for transportation areas in southern Minnesota, 2011.**

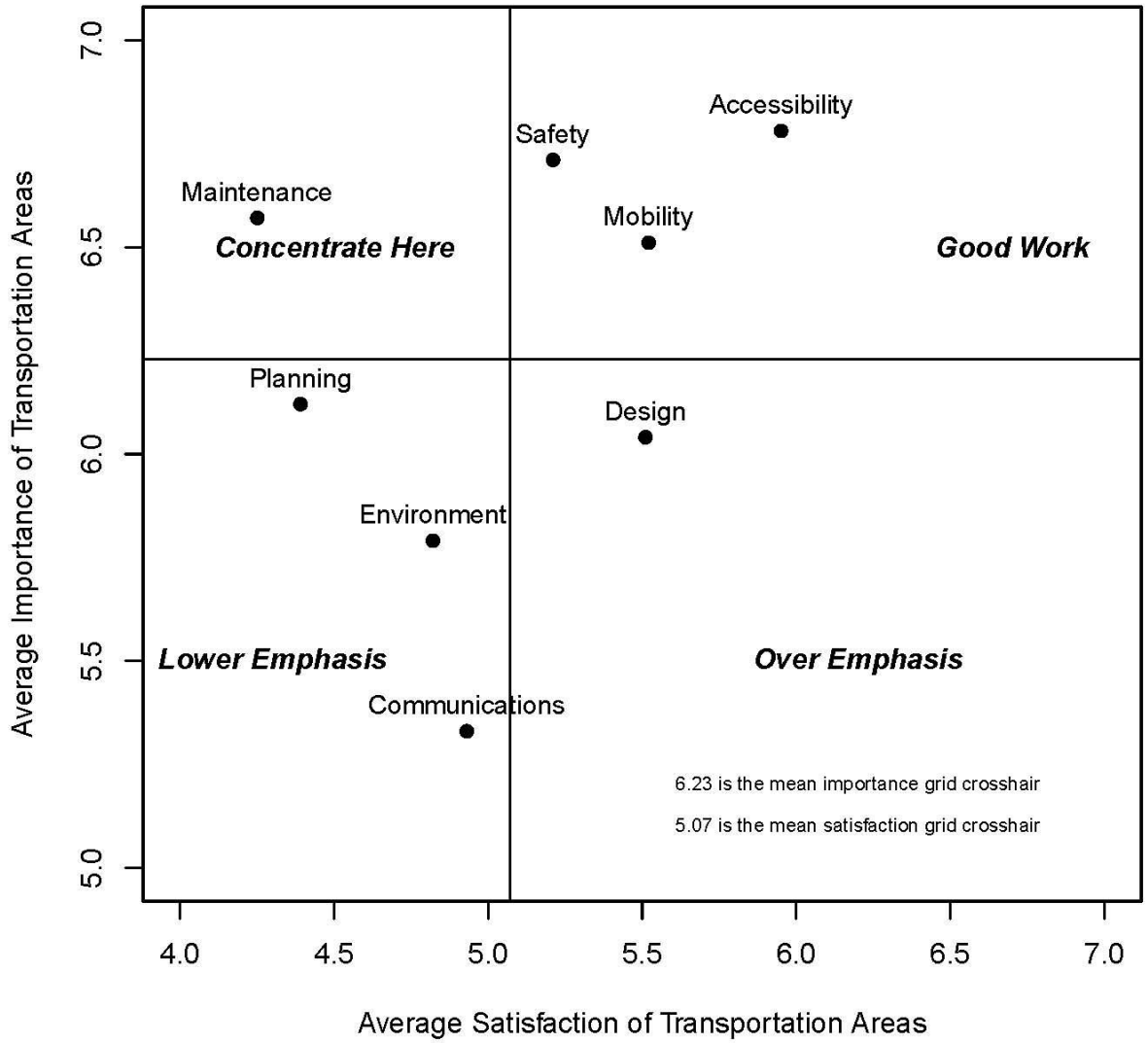


***Figure 4.18.*** **Importance and performance analysis for transportation areas for younger group in Minnesota, 2011.**

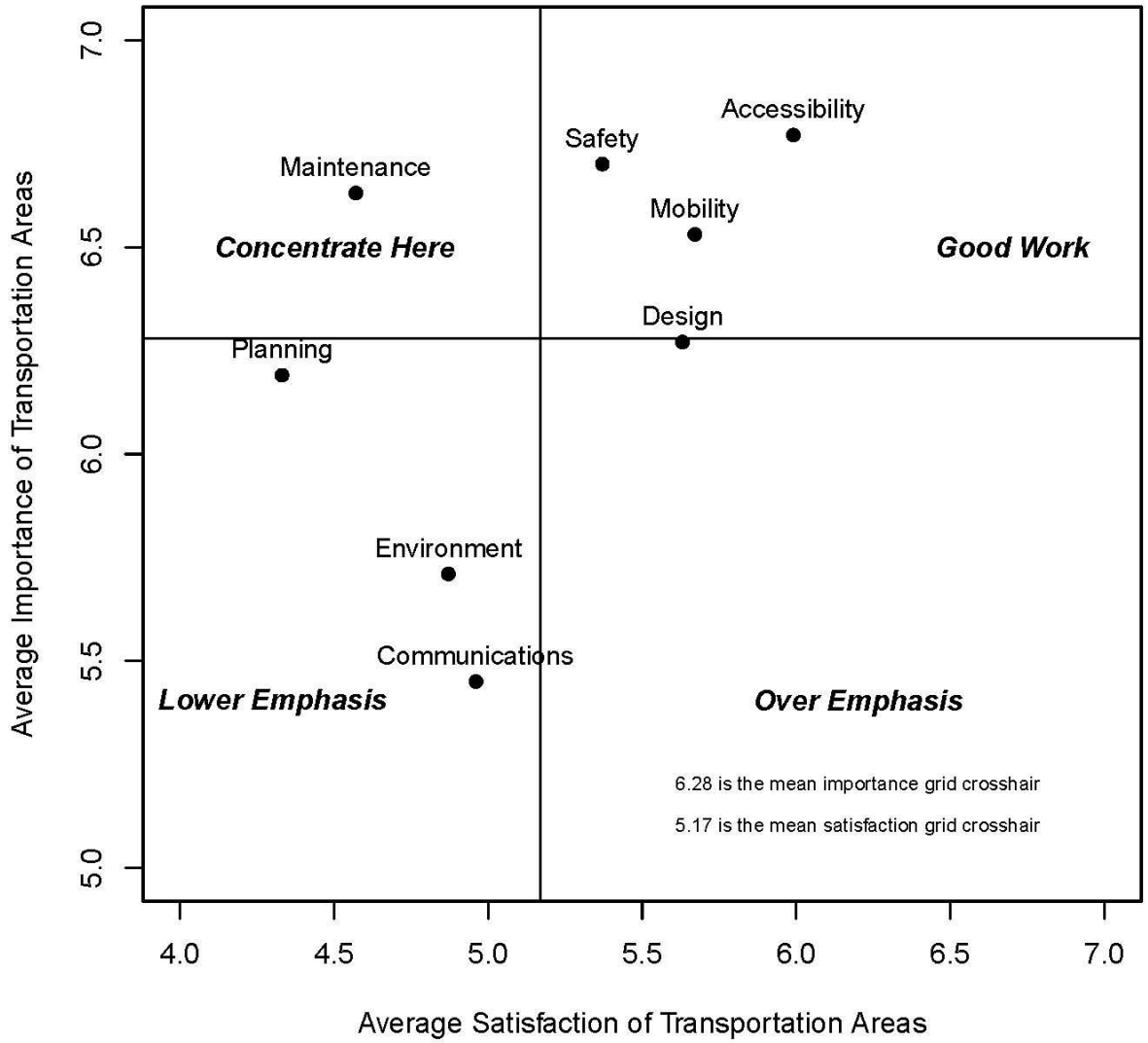


***Figure 4.19.*** **Importance and performance analysis for transportation areas for middle aged group in Minnesota, 2011.**

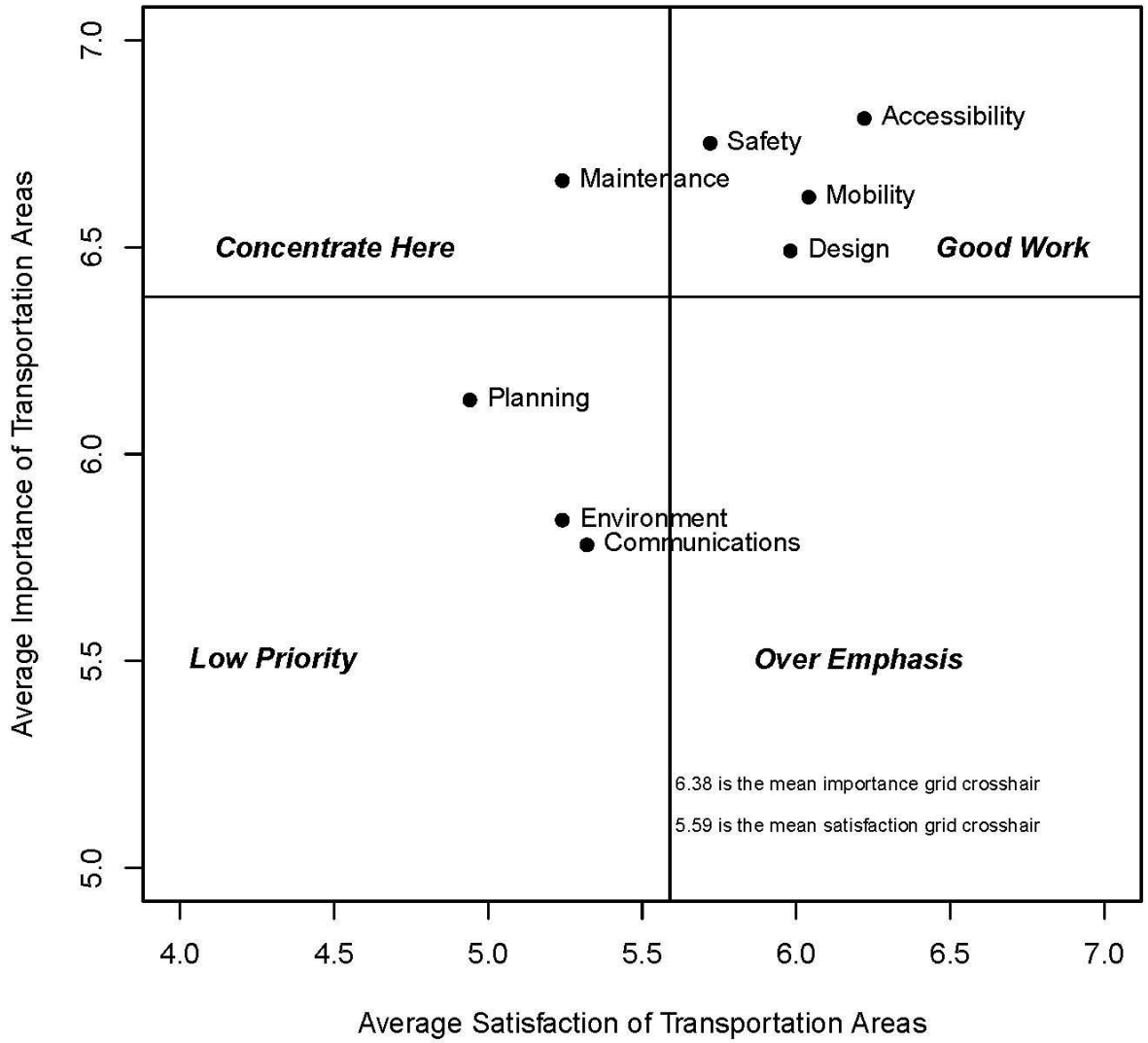


***Figure 4.20.*** **Importance and performance analysis for transportation areas among older aged group in Minnesota, 2011.**

4.2.6: How life areas related to one another and could be categorized.

Quality of life factor analysis

The 11 quality of life factors were examined for underlying structure or relationships. Three groups of factors emerged which explained 59% of the variance in quality of life. The three groups of life areas are 1) education, environment, employment, housing and transportation, 2) family, friends and health, 3) recreation and local services/amenities (Table 4.17). The item of spirituality, serenity and faith did not factor and was left as a single item.

**Table 4.17.**

***Factor analysis of quality of life areas, Minnesota, 2011.***

| Factor 1 | Factor 2 | Factor 3 |
|---|---|---|
| Education | Health | Local services/ amenities |
| Environment | Family | Recreation |
| Employment | Friends | |
| Housing | | |
| Transportation | | |

### *4.3 MnDOT Priorities, short and long term*

To understand Minnesota residents' transportation priorities over the next 3-5 years and for the next generation, we asked survey participants to indicate the three most important areas where MnDOT should focus. Respondents listed maintenance, access and safety ideas as the most important areas for both the near term and long term, although their rank changed slightly (Table 4.17).

**Table 4.18.**

***Percent of open-ended respondents' ideas for short- and long-term MnDOT priorities, 2011.***

| Theme | Subtheme | MnDOT focus near term | Near term rank | MnDOT focus long term | Long term rank |
|---|---|---|---|---|---|
| **Maintenance** | | **34.94%** | **1** | **21.67%** | **2** |
| | Roads/general | 27.30 | | 16.77 | |
| | Bridges | 3.56 | | 2.47 | |
| | Snow/ice removal | 3.17 | | 1.67 | |
| | Other | 0.57 | | 0.12 | |
| | Efficiency | 0.34 | | 0.65 | |
| **Access** | | **19.17%** | **2** | **25.8%** | **1** |
| | Public transportation | 12.63 | | 17.40 | |
| | General (new routes, new bridges, etc) | 3.10 | | 3.95 | |
| | Non-motorized transportation | 2.71 | | 3.07 | |
| | Services (carpool lanes, park & rides, etc.) | 0.66 | | 0.93 | |

| | | | | | |
|---|---|---|---|---|---|
| | Other | 0.07 | | 0.45 | |
| **Safety** | | **12.18%** | **3** | **15.18%** | **3** |
| | General | 8.51 | | 9.8 | |
| | Speed | 1.20 | | 1.47 | |
| | Bikes & pedestrians | 0.66 | | 0.50 | |
| | Distracted driving | 0.60 | | 1.07 | |
| | Regulation/enforcement | 0.57 | | 0.73 | |
| | Education | 0.51 | | 1.15 | |
| | Other | 0.12 | | 0.40 | |
| **Mobility** | | **11.40%** | **4** | **8.58%** | **5** |
| | Traffic flow and congestion | 10.33 | | 7.90 | |
| | Construction | 0.62 | | 0.22 | |
| | Other | 0.28 | | 0.07 | |
| | Commute/travel time | 0.18 | | 0.40 | |
| **Design** | | **9.02%** | **5** | **7.85%** | **6** |
| | Signage | 2.26 | | 1.48 | |
| | Specific features | 2.04 | | 2.15 | |
| | Lights | 1.88 | | 1.00 | |
| | Quality | 1.50 | | 1.82 | |
| | Road material | 1.35 | | 1.40 | |
| **Communication** | | **8.02%** | **6** | **10.52%** | **4** |
| | Planning | 3.08 | | 4.83 | |
| | Finances | 2.76 | | 4.55 | |
| | Organization (hiring, urban v. rural, etc.) | 1.38 | | 0.28 | |
| | Other | 0.43 | | 0.28 | |
| | Communication | 0.40 | | 0.57 | |
| **Environment** | | **3.73%** | **7** | **7.57%** | **7** |
| | General | 2.07 | | 4.22 | |
| | Reduce run-off | 0.50 | | 0.48 | |
| | Other | 0.48 | | 0.68 | |
| | Air | 0.25 | | 0.70 | |
| | Fuel alternative/efficiencies | 0.23 | | 0.93 | |
| | Reduce car use | 0.19 | | 0.55 | |
| **Other** | **Other** | **1.53%** | | **2.83%** | |

### *4.4 Demographic profile and community experience*

Respondents reported an average age of 59.79, ranging from 17 to 98 years (Table 4.18). More than half of respondents were male (67.0%).The majority of the sample was non-Hispanic (98.8%) and white (94.3%). Respondent income was approximately normally distributed and the most frequently reported income was $50,000-74,999 (21.1%). The majority of people were employed full time (52.2%) but 36.1% of respondents were retired.

Respondents lived in Minnesota and in their community for multiple decades and typically year-round (Table 4.19). On average, respondents lived in Minnesota for 49 years and lived in their present community 30 years. Only 10% were seasonal residents (Table 4.19). On average, two people lived in the respondents' household (Figure 4.20), but respondents reported a household range from one to fifteen (Figure 4.21). Similarly, respondents most frequently indicated they had two working automobiles associated with their household, with a range from one to seventeen. Eleven percent of respondents identified themselves as a person with a disability (Figure 4.22).

When asked about typical trips taken in a week, respondents indicated they drove alone most frequently for work, shopping and recreational focused trips (Table 4.20). Among all respondents, 26.6% (n=852) reported using public transportation in the last twelve months and 40.6% respondents (n=1284) reported they had biked outdoors.

Just more than half of respondents reported travel to or from work from Monday to Friday and were identified as commuters (55.9%; Figure 4.23). Commuters in the sample travelled an average of 16.04 miles one way per trip (Figure 4.24) and the majority travelled five

**Table 4.19.**
***Demographics of respondents to transportation and quality of life questionnaire in Minnesota, 2011***

| | State | Metro | Central | Northeast | Northwest | South |
|---|---|---|---|---|---|---|
| | % (n) | % (n) | % (n) | % (n) | % (n) | % (n) |
| Gender | | | | | | |
| Male | 67.0 (2191) | 64.8 (1120) | 73.1 (207) | 64.3 (173) | 69.2 (209) | 70.1 (470) |
| Female | 31.9 (1043) | 34.1 (590) | 26.1 (74) | 33.5 (90) | 29.5 (89) | 29.4 (197) |
| Prefer not to respond | 1.1 (36) | 1.1 (19) | 0.7 (2) | 2.2 (6) | 1.3 (4) | 0.4 (3) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Total | 100 (3270) | 100 (1729) | 100 (283) | 100 (269) | 100 (302) | 100 (670) |
| Ethnicity | | | | | | |
| Non-Hispanic/ Non-Latino | 98.8 (2661) | 98.6 (1406) | 98.6 (219) | 99.2 (236) | 98.4 (239) | 99.5 (549) |
| Hispanic/Latino | 1.2 (32) | 1.4 (20) | 1.4 (3) | 0.8 (2) | 1.6 (4) | 0.5 (3) |
| Total | 100 (2693) | 100 (1426) | 100 (222) | 100 (238) | 100 (243) | 100 (552) |
| Race | | | | | | |
| White | 94.3 (3120) | 92.8 (1624) | 95.8 (274) | 96.7 (263) | 95.4 (290) | 96.8 (655) |
| Asian | 1.2 (39) | 2.0 (35) | - | - | 0.3 (1) | 0.4 (3) |
| American Indian/ Alaskan native | 1.0 (33) | 0.7 (13) | 1.7 (5) | 1.8 (5) | 2.0 (6) | 0.6 (4) |
| Other | 1.0 (32) | 1.0 (17) | 1.0 (3) | 1.1 (3) | 2.3 (7) | 0.3 (2) |
| Black/ African American | 0.8 (27) | 1.4 (24) | - | 0.7 (2) | - | 0.1 (1) |
| Native Hawaiian/ Pacific Islander | 0.1 (3) | 0.1 (2) | - | - | - | 0.1 (1) |
| Total | N/A | | | | | |
| Age | | | | | | |
| 18-30 | 1.8 (60) | 2.2 (37) | 1.4 (4) | 2.6 (7) | 1.7 (5) | 1.1 (7) |
| 31-40 | 8.3 (268) | 9.2 (158) | 10.3 (29) | 5.6 (15) | 6.0 (18) | 6.9 (46) |
| 41-50 | 16.7 (543) | 18.1 (311) | 19.9 (56) | 13.0 (35) | 12.7 (38) | 15.5 (103) |
| 51-60 | 25.1 (815) | 25.7 (441) | 26.2 (74) | 23.0 (62) | 23.1 (69) | 24.0 (160) |
| 61-70 | 23.5 (762) | 22.9 (394) | 23.4 (66) | 24.9 (67) | 22.1 (66) | 25.1 (167) |
| 71 or older | 24.6 (800) | 21.9 (376) | 18.8 (53) | 30.9 (83) | 34.4 (103) | 27.5 (183) |
| Total | 100 (3248) | 100 (1717) | 100 (282) | 100 (269) | 100 (299) | 100 (666) |
| Annual household income (U.S. Dollars) | | | | | | |
| Less than $25,000 | 12.9 (384) | 10.0( 158) | 12.8 (34) | 17.7 (44) | 21.7 (59) | 14.5 (88) |

| | | | | | | |
|---|---|---|---|---|---|---|
| $25,000-34,999 | 10.6 (318) | 8.3 (132) | 10.2 (27) | 12.5 (31) | 13.6 (37) | 14.8 (90) |
| $35,000-49,999 | 15.2 (454) | 14.0 (221) | 17.0 (45) | 20.2 (50) | 19.1 (52) | 13.5 (82) |
| $50,000-74,999 | 21.1 (631) | 19.4 (307) | 25.3 (67) | 21.0 (52) | 21.0 (57) | 24.2 (147) |
| $75,000-99,999 | 14.6 (437) | 15.3 (242) | 13.6 (36) | 9.7 (24) | 11.0 (30) | 17.0 (103) |
| $100,000-124,999 | 11.2 (334) | 12.8 (202) | 12.1 (32) | 12.9 (32) | 5.9 (16) | 8.4 (51) |
| $125,000-149,999 | 5.0 (149) | 6.3 (99) | 4.2 (11) | 2.8 (7) | 2.9 (8) | 3.6 (22) |
| $150,000-174,999 | 3.2 (95) | 4.7 (75) | 1.1 (3) | 0.4 (1) | 1.1 (3) | 2.0 (12) |
| $175,000 or More | 6.2 (186) | 9.2 (146) | 3.8 (10) | 2.8 (7) | 3.7 (10) | 2.0 (12) |
| Total | 100 (2988) | 100 (1582) | 100 (265) | 100 (248) | 100 (272) | 100 (607) |
| Highest level of education | | | | | | |
| Some high school | 2.9 (87) | 1.7 (26) | 5.0 (13) | 3.0 (7) | 5.1 (14) | 4.4 (27) |
| Graduated high school/GED | 18.4 (547) | 13.0 (204) | 21.8 (57) | 19.8 (47) | 27.3 (75) | 26.6 (164) |
| Some votech | 2.7 (81) | 2.8 (44) | 2.7 (7) | 3.4 (8) | 2.9 (8) | 2.3 (14) |
| Graduated from votech | 10.8 (320) | 7.7 (121) | 16.5 (43) | 13.5 (32) | 13.5 (37) | 13.6 (84) |
| Completed associate degree | 5.3 (156) | 6.2 (98) | 6.5 (17) | 2.1 (5) | 3.3 (9) | 4.1 (25) |
| Some college | 12.8 (381) | 12.9 (203) | 10.3 (27) | 19.0 (45) | 15.6 (43) | 9.7 (60) |
| Graduated from college | 24.9 (739) | 29.1 (457) | 20.7 (54) | 16.0 (38) | 18.2 (50) | 22.5 (139) |
| Some postgraduate | 5.1 (152) | 5.5 (86) | 3.8 (10) | 7.6 (18) | 4.0 (11) | 4.4 (27) |
| Postgraduate degree(s) | 17.1 (508) | 21.0 (330) | 12.6 (33) | 15.6 (37) | 10.2 (28) | 12.5 (77) |
| Total | 100 (2971) | 100 (1569) | 100 (261) | 100 (237) | 100 (275) | 100 (617) |
| Employment | | | | | | |
| Employed full time | 52.2 (1683) | 55.8 (953) | 56.4 (158) | 34.8 (93) | 43.1 (129) | 51.6 (338) |
| Retired | 36.1 (1164) | 32.0 (546) | 33.9 (95) | 49.4(132) | 47.2 (141) | 37.9 (248) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Employed part time | 6.7 (215) | 6.1(104) | 5.7 (16) | 12.0(32) | 6.4 (19) | 6.6 (43) |
| Unemployed | 2.4 (77) | 3.2 (55) | 1.8 (5) | 0.7 (2) | 1.7 (5) | 1.4 (9) |
| Other | 1.3 (42) | 1.6 (27) | 0.7(2) | 0.4 (1) | 0.7 (2) | 0.8 (5) |
| Self-employed | 1.1 (36) | 1.0 (17) | 1.1 (3) | 1.1 (3) | 0.7 (2) | 1.5 (10) |
| Student | 0.3 (9) | 0.4 (6) | 0.4 (1) | 1.9 (5) | 1.0 (3) | 0.3 (2) |
| Total | 100 (3226) | 100 (1708) | 100 (280) | 100 (267) | 100 (299) | 100 (655) |

*Note*[a] Due to possible selection of multiple categorical responses total does not equal 100.

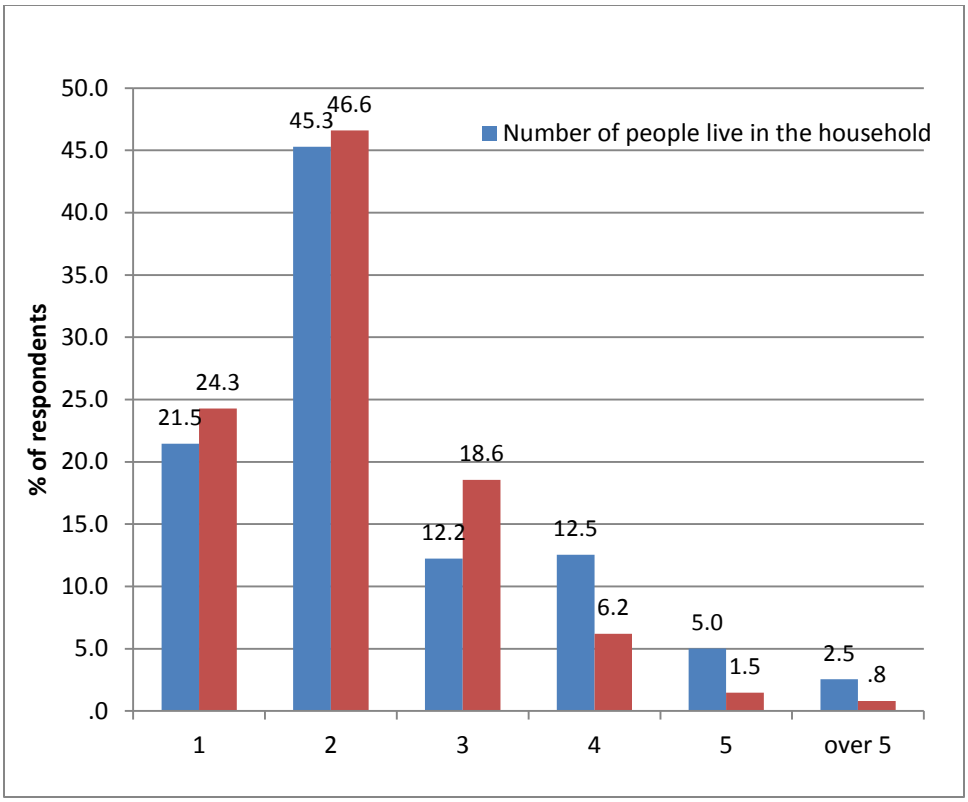


***Figure 4.21.*** **Number of people and autos per household in Minnesota, 2011.**

**Table 4.20**

***Residential experience among respondents to questionnaire, 2011***

| | State | | Metro | | Central | | Northeast | | Northwest | | South | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Years lived in Minnesota | 49.12 | 20.18 | 47.01 | 19.96 | 49.37 | 18.82 | 53.03 | 18.67 | 51.18 | 21.43 | 51.94 | 20.84 |
| Years lived in this community | 29.77 | 20.17 | 26.47 | 18.16 | 28.59 | 19.55 | 33.46 | 20.09 | 33.2 | 22.00 | 35.69 | 22.20 |
| Number of months in community | 11.7 | 1.22 | 11.75 | 1.08 | 11.73 | 1.27 | 11.57 | 1.44 | 11.4 | 1.84 | 11.72 | 1.11 |

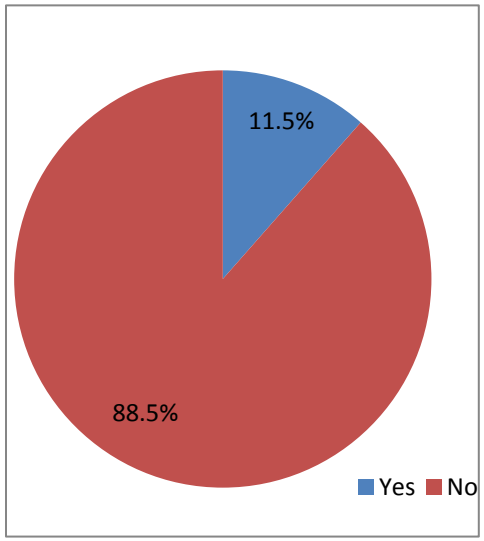


***Figure 4.22*. Percentage of people reporting a disability.**

**Table 4.21**

***Frequency of travel modes for various trip purposes in Minnesota, 2011***

| | Travel Mode | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Drive Alone | Car-pool | Bus (Public) | Metro Trains (Light Rail or Commuter Rail) | Bike | Walk | Taxi / Shuttle | Tele-commute (working from a remote location) |
| **Trip Purpose** | %(n) | %(n) | %(n) | %(n) | %(n) | %(n) | %(n) | %(n) |
| To/from work (n=2384) | 77.56(1849) | 5.87(140) | 3.65(87) | 0.88(21) | 3.94(94) | 3.48(83) | 0.34(8) | 4.28(102) |
| To/from school (n=260) | 60.77(158) | 18.08(47) | 6.92(18) | 0.38(1) | 3.85(10) | 7.31(19) | 0.38(1) | 2.31(6) |
| Shopping or errands (n=3715) | 75.56(2807) | 12.17(452) | 1.40(52) | 0.35(13) | 3.74(139) | 6.46(240) | 0.32(12) | - |
| Recreation, entertainment or meals (n=3907) | 57.23(2236) | 23.80(930) | 1.33(52) | 1.69(66) | 6.48(253) | 8.80(344) | 0.67(26) | - |
| Other/Specify/Various (n=199) | 56.78(113) | 14.57(29) | 4.02(8) | 8.04(16) | 5.53(11) | 6.53(13) | 4.52(9) | - |
| Medical (n=69) | 63.24(43) | 10.29(7) | 14.71(10) | 4.41(3) | - | 2.94(2) | 4.41(3) | - |
| Volunteer (n=27) | 92.59(25) | 3.70(1) | - | - | 3.70(1) | - | - | - |
| Church (n=90) | 68.89(62) | 24.44(22) | 1.11(1) | - | 1.11(1) | 2.22(2) | 2.22(2) | - |

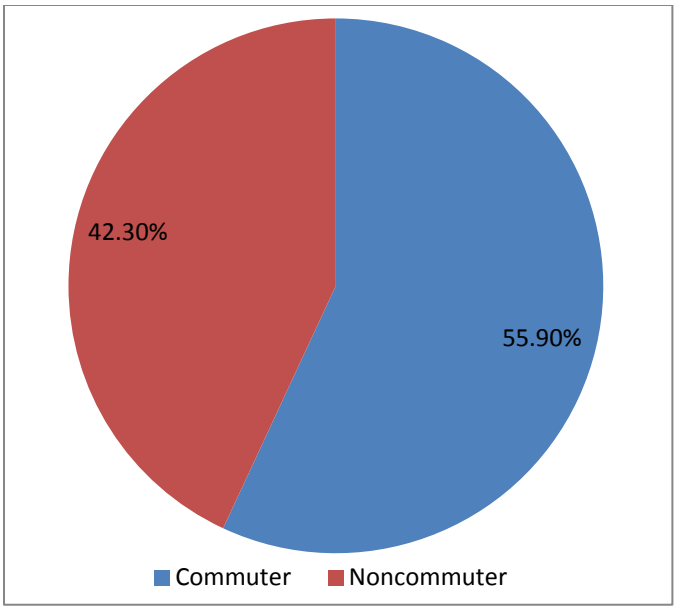


***Figure 4.23.*** **Percentage of respondents self-identified as commuters or non-commuters in Minnesota, 2011.**

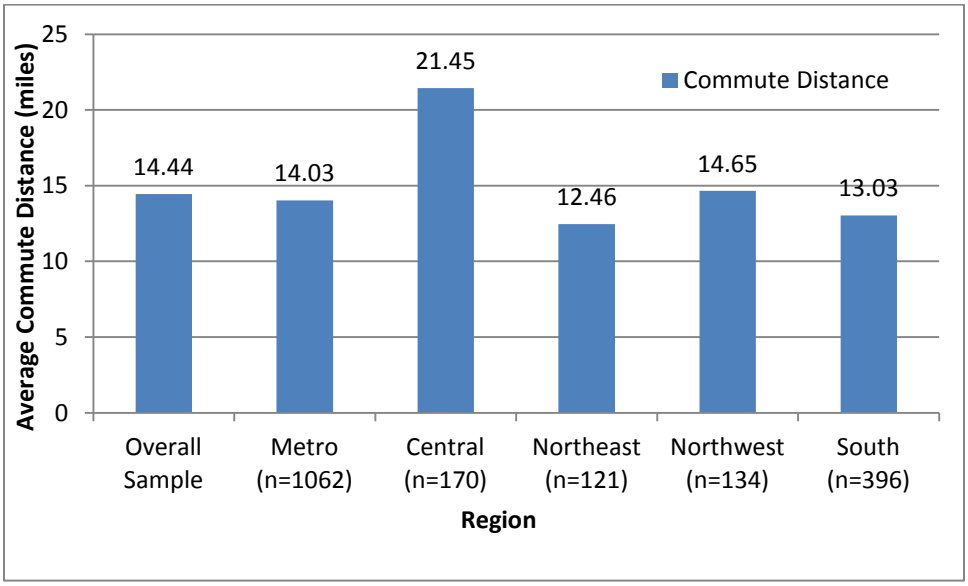


***Figure 4.24.*** **Average commute distance in miles by region in Minnesota, 2011.**

days per week (73.8%; Table 4.21, Figure 4.25).The vast majority of commuters (85.3%) travelled between 6 and 9 am and 6 to 6:30 pm. More than 80% of commuters were satisfied, at some level, with the predictability of their commute: 42% of commuters reported being very satisfied, 32.1% somewhat satisfied, and 9.2% slightly satisfied.

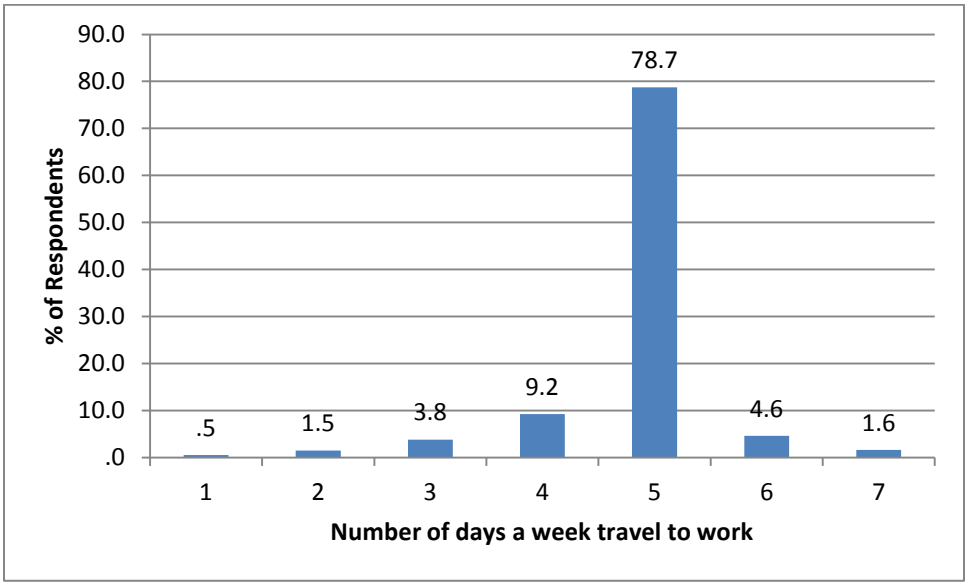


***Figure 4.25.*** **Distribution of number of days a week traveling to work in Minnesota, 2011.**

**Table 4.22**

***Commute travel frequency and length among respondents to questionnaire, 2011***

| | State | | Metro | | Central | | Northeast | | Northwest | | South | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| How many days a week do you travel to/from work Monday - Friday | 4.84 | 0.75 | 4.83 | 0.71 | 4.92 | 0.64 | 4.62 | 0.98 | 5.07 | 0.68 | 4.84 | 0.81 |
| Approximately how many miles is your trip one way | 14.44 | 13.26 | 14.03 | 10.25 | 21.45 | 17.02 | 12.46 | 15.16 | 14.65 | 16.68 | 13.03 | 15.69 |

# CHAPTER 5
# DISCUSSION & CONCLUSIONS

Data from a mail questionnaire among Minnesotans in 2011 reveals:

- quality of life is complex and transportation plays an important and consistent role in it across Minnesota;
- transportation is critical to quality of life because it connects us to important destinations in aspects that matter most; and
- Minnesotans can readily identify what matters and how the state is performing within the breadth of transportation services.

This rich data set affords a number of analysis and discussion opportunities. However, this project primarily focused on five research questions and, as such, the discussion centers around them:

1. If/how does transportation contribute to satisfaction with quality of life among Minnesotans?
2. If/how does satisfaction with transportation areas (access, etc.) contribute to satisfaction with transportation overall?
3. How important is each of the transportation areas (access, etc.)?
4. How satisfied are Minnesota residents with each of the transportation areas (access, etc.)?
5. How does perceived MnDOT performance compare with perceived importance on each of the transportation areas (access, etc.)?

## 5.1 How does transportation contribute to satisfaction with quality of life among Minnesotans?

Data from a survey of a sample of Minnesota residents found transportation was an important quality of life area as indicated by its rating above 5.0 on an importance scale, its inclusion the list of most important areas for quality of life, as well as its predictive power in select models explaining quality of life. Similar to other research, consistent findings with statistical models of quality of life remain elusive. Still, transportation retained its importance across regions and increased in importance with respondent age.

Other research typically focuses on specific components of transportation that might significantly influencing quality of life (Senlier et al., 2009; Gabriel and Bowling, 2004; Feng and Hsieh, 2009). However, this research examined transportation holistically and found transportation was a significant predictor of quality of life for the state population overall, though the variance explained was quite low. The significance of transportation to quality of life is similar to select models found by Michalos and Zumbo (1999) but the explained variance much

lower than other models. Different dependent measures are certainly one explanation for the differences in explanatory power as is the relatively low variance within the predictor variables. Regardless, definitive answers about transportation's role in quality of life remain absent. Statistically in the Minnesota model, transportation suppressed variance in other variables and made them better predictors of quality of life. As such, one can ascertain the statistical contribution of transportation is in its support of other important life areas. The practical contribution of transportation to quality of life remains difficult to quantify but certainly the oft-used 'transportation as a means to an end' seems to stand. As noted in the focus group portion of the study and assessment of transportation areas in the questionnaire, its quality matters.

### 5.2 If/how does satisfaction with transportation areas (access, etc.) contribute to satisfaction with transportation overall?

Predictive analysis revealed that seven of the eight factors examined were significant to understand satisfaction with MnDOT services (in rank order): maintenance, planning, accessibility, design, safety, communication, and mobility. Environmental impacts were not a significant predictor to satisfaction with MnDOT services. These models were similar for commuters. Given this is relatively new analysis, comparisons with other research is obviously difficult. However, this initial analysis clearly prioritizes maintenance for satisfaction with MnDOT services followed quite distantly by the other areas. An advantage to this research is the detail that enables understanding of what contributes to satisfaction with maintenance and the other transportation areas. The rank order of transportation areas contributing to satisfaction with MnDOT services may be somewhat surprising given the amount of attention to access and mobility in transportation literature and rhetoric. This analysis creates an opportunity to reconsider measures of success and if they should be identified through predicting satisfaction, descriptive importance to Minnesotans or some combination thereof. Further, the data presents an opportunity to better understand specific segments such as commuters, those taking public transportation and people with disabilities. Decisions on how to integrate this information into planning and programming are exciting to consider.

### 5.3 Transportation area importance, satisfaction and performance

All of the transportation areas studies were deemed important by Minnesota residents, regardless of region, mirroring focus group results where Minnesotans were unable to identify what part of transportation they could do without (Schroeder et al. 2011). The importance of transportation areas did differ by age, however. The importance older residents attributed to mobility matches previous research where it was found to play an important role in quality of life (Metz, 2000; Gabriel and Bowling, 2004; Hjorthol et al., 2010). Older residents also identified design, communications and environmental issues as more important than other age groups. Little information is available to help contextualize these findings, but clearly they deserve additional attention. Our supplemental analysis used predictive modeling to determine what measured items contributed most to these transportation areas (Appendix D). Additional analysis with this existing data could compare predictive analysis by age groups to further identify where the differences lie. Certainly the predictive analysis of these areas to satisfaction with MnDOT services provides more detail on their weight in Minnesotan's minds.

Overall, MnDOTs performance should be commended as their performance was viewed as satisfactory by more than 8 of 10 respondents. Two transportation areas, however, fell below the 5.0 mark for satisfaction: maintenance and long-term planning. The importance-performance analysis clearly indicates maintenance is an area that deserves attention, whereas planning, communications and environment were much less of a priority. Because planning was part of the more encompassing area of 'transparency', details about what contributes to satisfaction with planning remain unknown from this dataset. Information from the ongoing MnDOT planning processes may be informative to ascertain what matters in planning. Planning is part of a larger 'transparency' area which was identified as a low priority area for the current time period, but does appear to increase as a priority for the future. Notably, at the time of the survey MnDOT was embarking on a 50 year transportation planning process. Certainly residential choice, work patterns and multi-modal developments are important factors for future planning processes. Communications and environment were near the 5.0 mark and could be considered for monitoring to improve performance issues. While this research did not detail items to predict satisfaction with communications in detail, focus group research could be re-evaluated to consider possible items.

Attention to maintenance opportunities are very clear when considering its gap analysis between importance and satisfaction, contribution to satisfaction with MnDOT services overall, and priority in both the short- and long term future.

Although overall regions were more similar than different in their satisfaction ratings, some differences did emerge. Depending on level of assessment, these differences may provide insight for discussion about unique factors associated with those areas as well as ongoing challenges in those areas.

### 5.4 Opportunities

Across Minnesota it is clear that transportation plays an important and consistent role in quality of life. However, transportation is one of eleven areas of quality of life. As such, connecting and integrating with relevant partners is essential. Certainly MnDOT already has a number of vibrant partnerships in areas most important to Minnesota. Assessing the strength and status of those relationships may be in order, particularly in light of staffing changes due to retirements. Beyond topical areas, multi-jurisdictional partnerships also need to be retained and strengthened toward a seamless and service-oriented transportation system. Investigating and implementing ways to maximize those partnerships toward seamless and comprehensive services can enhance MnDOTs role in quality of life as well as Minnesotan's satisfaction with quality of life.

However, to retain that performance in the context of quality of life, performance measures and indicators would benefit from a review to confirm if and how they are addressing the areas important to Minnesotans. This is the next phase of this project.

Although overall satisfaction with MnDOT was high, opportunities to improve performance were identified in both planning and maintenance as evidenced by their satisfaction scores. Maintenance, access and safety are priority areas for Minnesotans both now and in the future. Retaining or improving performance can happen by attending to the factors that predict

satisfaction in these areas, as noted above. Residents in the Central and Metro regions were less satisfied than other respondents overall, but with maintenance and safety in particular. Exploring this difference, with existing and new data as needed, is recommended.

Given the aged are a large and growing percent of the population, their higher satisfaction with transportation is important to note and retain. Identifying and attending to changing transportation needs through the life-time is a pressing issue in Minnesota and the U.S. as a whole. Similarly, the role transportation plays for non-White residents and new immigrants is important but under-researched. Ensuring diverse voices are incorporated into MnDOT programs and planning can strengthen them now and for the future.

This project focused on five main research questions surrounding transportation and quality of life. While the project resulted in a high response rate, the respondents were still older, more educated and less diverse than the state. As such, research with diverse populations is strongly recommended to examine if and how these models and ratings differ across racial and ethnic groups. Still, significant insight is provided by the data and will inform the next phase of this project as well and MnDOT programming and services in the future.

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# Appendix A
# Questionnaire

# *Transportation & Quality of life*

*First, a few questions about your experience in Minnesota and your travel patterns.*

**1. How many years have you lived in Minnesota (write in #)?**

____ Years (if less than 1, put 0)

**2. How many years have you lived in this community?**

____ Years (if less than 1, put 0)

**3. How many months of the year do you live in this community?**

____ Months of the year

*Please think about the community you live in – and your travels to and from this community – as you answer this survey.*

**4. Do you travel "To/From Work" Monday-Friday (check one)?**

___Yes ___No **(If no, go to Question 5)**

**Approximately how many miles is your trip one way?**

_____ Miles one way

**How many days a week do you travel to/from work Monday-Friday?**

____ Days to work

**Typically, are these trips during the hours of 6-9 am and 3-6:30pm?**

___ Yes ___No

**How satisfied are you with the predictability of your travel to/from work (check inside one box)?**

| Very Satisfied | Somewhat Satisfied | Slightly Satisfied | Neither | Slightly Dissatisfied | Somewhat Dissatisfied | Very Dissatisfied |
|---|---|---|---|---|---|---|
| | | | | | | |

**5. How many times in the last 12 months within Minnesota have you…**

**taken public transportation (bus, train)?** ____ Approx. # times in last 12 months

**biked outdoors?** ____ Approx. # times in last 12 months

**6. Please identify the trips you take in a typical week. Check all the boxes that best represent the ways that you use to get to those places.** ***(Please check all the options that make up your typical trip. For example for To/From Work: drive alone to park-n-ride, take bus downtown, bike to office).***

| Trips | Ways to travel | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Drive Alone | Car-pool | Bus (Public) | Metro Trains (Light Rail or Commuter Rail) | Bike | Walk | Taxi / Shuttle | Tele-commute (working from a remote location) | Not Ap-plicable |
| To/from work | | | | | | | | | |
| To/from school | | | | | | | | | |
| Shopping or run errands | | | | | | | | | |
| Recreation, entertainment or meals | | | | | | | | | |
| Other: *Specify:* _____ | | | | | | | | | |

**7. How satisfied are you with transportation in your community (check inside one box)?**

| Very Satisfied | Somewhat Satisfied | Slightly Satisfied | Neither | Slightly Dissatisfied | Somewhat Dissatisfied | Very Dissatisfied |
|---|---|---|---|---|---|---|
| | | | | | | |

**8. Please let us know about your current transportation situation by checking one box in each row below.**

| | Not at all | A little | Mod-erately | Mostly | Com-pletely |
|---|---|---|---|---|---|
| To what extent do you have adequate means of transportation? | | | | | |
| How much do difficulties with transportation options restrict your life? | | | | | |
| To what extent do you have problems with transportation options? *Please explain*: _____ | | | | | |

*Now, think about your quality of life. By "quality of life" we mean "the general wellbeing of residents taking into consideration such things as educational opportunities, employment opportunities, the economy, health, housing, recreation and entertainment opportunities, and so forth."*

**9. How satisfied are you with the quality of your life (check inside one box)?**

| Very Satisfied | Somewhat Satisfied | Slightly Satisfied | Neither | Slightly Dissatisfied | Somewhat Dissatisfied | Very Dissatisfied |
|---|---|---|---|---|---|---|

**10. The following factors relate to quality of life. Please indicate how important each is as a contributor to your quality of life. (check one box per row)**

| | Very Important | Somewhat Important | Slightly Important | Neither | Slightly Unimportant | Somewhat Unimportant | Very Unimportant |
|---|---|---|---|---|---|---|---|
| a. Education | | | | | | | |
| b. Transportation | | | | | | | |
| c. Environment | | | | | | | |
| d. Housing | | | | | | | |
| e. Family, friends & neighbors | | | | | | | |
| f. Health | | | | | | | |
| g. Safety & security | | | | | | | |
| h. Spirituality, faith & serenity | | | | | | | |
| i. Local services & amenities (library, shopping, community services, etc.) | | | | | | | |
| j. Recreation & entertainment (parks, music, restaurants, theatre) | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| k. Employment/ finances | | | | | | | |

**Now, looking at the above list, which 3 are the <u>most</u> important factors as contributors to your quality of life?**

**_____ _____ _____ (write in 3 letters from the list above, a-k)**

*Part of your life involves transportation. We are interested in learning more about your thoughts related to several areas of transportation. In this section, we ask about your perceptions of these areas and your satisfaction with them. The first section focuses on the physical layout of the transportation system and includes the roads, signs, and lights. Then, we move to the environment and safety areas.*

**11. How satisfied are you with the following parts of the roadway design? (check one box per row)**

| | Very Satisfied | Somewhat Satisfied | Slightly Satisfied | Neither | Slightly Dissatisfied | Somewhat Dissatisfied | Very Dissatisfied | Not Ap-plicable |
|---|---|---|---|---|---|---|---|---|
| a. Highway sign placement (including alternate route signs, speed limit) | | | | | | | | |
| b. Stoplight timing | | | | | | | | |
| c. Use of flashing yellow lights | | | | | | | | |
| d. Use of Roundabout intersections | | | | | | | | |
| e. Speed of construction projects | | | | | | | | |
| f. Cost of construction projects | | | | | | | | |
| g. Bridges | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| h. On road bike lanes | | | | | | | | |
| i. Rumble strips<br>loud road markers on road edge & at intersections) | | | | | | | | |

**Now, looking at the above list, which 2 are the <u>most</u> important parts of roadway design?**

**_____ _____ (write in 2 letters from the list above, a-i)**

**12. Please indicate the extent of your agreement that the following transportation and environmental related issues impact your community? (check one box per row)**

| | Very Strongly Agree | Some-what Agree | Slightly Agree | Neither | Slightly Disagree | Some-what Disagree | Very Strongly Disagree | N/A |
|---|---|---|---|---|---|---|---|---|
| a. Noise pollution from trains | | | | | | | | |
| b. Noise pollution from traffic | | | | | | | | |
| c. Air pollution | | | | | | | | |
| d. Light pollution from street lights | | | | | | | | |
| e. Water pollution | | | | | | | | |
| f. Drainage problems /flooding | | | | | | | | |

**Now, looking at the above list, which 2 are the <u>most</u> important environmental impacts?**

**_____ _____ (write in 2 letters from the list above, a-f)**

**13. Please share your thoughts about the safety of various transportation areas by checking one box in each row below.**

| | Very Safe | Some-what Safe | Slightly Safe | Neither | Slightly Unsafe | Some-what Unsafe | Very Unsafe | N/A |
|---|---|---|---|---|---|---|---|---|
| a. How safe do you feel on the road with other drivers? | | | | | | | | |
| b. Excluding other drivers, how safe do you feel using the actual roadways? | | | | | | | | |
| c. How safe is your community for pedestrians? | | | | | | | | |
| d. How safe is your community for bicyclists? | | | | | | | | |
| e. How safe are the railroad crossings in your community? | | | | | | | | |

**Now, looking at the above list, which 2 are the <u>most</u> important safety areas of transportation?**

**_____ _____ (write in 2 letters from the list above, a-e)**

*This section focuses on your ability to get places you need and want to go and how easy it is to get there.*

**14. How satisfied are you with the following parts of the transportation system?**

| | Very Satisfied | Somewhat Satisfied | Slightly Satisfied | Neither | Slightly Dissatisfied | Some-what Dissatisfied | Very Dissatisfied | N/A |
|---|---|---|---|---|---|---|---|---|
| a. Access to taxis & other similar service transportation options | | | | | | | | |
| b. Access to air travel | | | | | | | | |
| c. Access to regional airports | | | | | | | | |
| d. Access to rail transportation between cities | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| e. Access to buses between cities | | | | | | | | |
| f. Availability of parking in your community | | | | | | | | |
| g. Access to public transportation (buses, trains) | | | | | | | | |
| h. Travel time within & around your community | | | | | | | | |
| i. Commute time to & from work | | | | | | | | |
| j. Weekend highway traffic | | | | | | | | |
| k. Travel time to/from the Twin Cities | | | | | | | | |
| l. Transportation options to/from the Twin Cities | | | | | | | | |
| m. Travel time through construction zones | | | | | | | | |
| n. Wait time at railroad crossings | | | | | | | | |
| o. Public transportation fees (buses, trains) | | | | | | | | |
| p. Access to sidewalks | | | | | | | | |
| q. Access to trails | | | | | | | | |
| r. Traffic information while traveling to alert motorists of delays, crashes and detours | | | | | | | | |

**Now, looking at the above list, which 3 are the <u>most</u> important parts of the transportation system? _____ _____ _____ (write in 3 letters from the list above, a-r)**

**15. Please indicate the extent of your agreement with the following statements about biking and walking safety in your neighborhood and community (check one box per row).**

| | Very Strongly Agree | Some-what Agree | Slightly Agree | Neither | Slightly Disagree | Some-what Dis-agree | Very Strongly Dis-agree |
|---|---|---|---|---|---|---|---|
| a. There is so much traffic along the street I live on that it makes it difficult or unpleasant to walk in my neighborhood | | | | | | | |
| b. There is so much traffic along nearby streets in my neighborhood that it makes it difficult or unpleasant to bike | | | | | | | |
| c. Is safe enough so that I would let a 10-year-old child walk around my block | | | | | | | |
| d. My neighborhood is safe enough for an 80-year-old senior to walk around the block | | | | | | | |
| e. It is safe to ride a bike considering the roadway design roadway (e.g. shoulder width, edge lines, rumble strips) | | | | | | | |
| f. It is safe to ride a bike, considering traffic and speeds | | | | | | | |
| g. Buses drive too fast in my area & make it unsafe for bikers & pedestrians | | | | | | | |
| **Now, looking at the above list, which 2 are the <u>most</u> important statements about biking and walking safety? _____ _____ (write in 2 letters from the list above, a-g)** | | | | | | | |

*This section focuses on the maintenance of the transportation system.*

**16. How satisfied are you with the following roadway maintenance related services of the transportation system? (check one box per row)**

| | Very | Some- | Slightly | Neither | Slightly Dis- | Some-what | Very Dis- |
|---|---|---|---|---|---|---|---|

| | Satisfied | what Satisfied | Satisfied | | satisfied | Dis-satisfied | satisfied |
|---|---|---|---|---|---|---|---|
| a. Clearing roads of snow & ice | | | | | | | |
| b. Clearing sidewalks of snow & ice | | | | | | | |
| c. Keeping road surfaces smooth | | | | | | | |
| d. Eliminating weeds on the roadsides | | | | | | | |
| e. Making highway signs clearly readable | | | | | | | |
| f. Making road/pavement markings clearly visible | | | | | | | |
| g. Removing roadside litter | | | | | | | |
| h. The visual appeal of the roadsides | | | | | | | |
| i. Clearing roads of debris (e.g. road kill, large objects) | | | | | | | |
| j. Rest areas for road trips | | | | | | | |

**Now, looking at the above list, which 2 are the <u>most</u> important maintenance related services of the transportation system?**

**_____ _____ (write in 2 letters from the list above, a-j)**

**17. As you can see from the questions you've been answering, transportation includes a variety of factors. How important are each of these factors that relate to transportation? (check one box per row)**

| | Very Important | Somewhat Important | Slightly Important | Neither | Slightly Unimportant | Somewhat Unimportant | Very Unimportant |
|---|---|---|---|---|---|---|---|
| a. Your **ability** to get places you need & want to go | | | | | | | |
| b. The physical layout of the roadway system (including roads, signs & lights) | | | | | | | |
| c. The **ease** of getting to places you need & want to go | | | | | | | |
| d. Overall maintenance of the highway & freeways | | | | | | | |
| e. Safety of the roadways (-highways & freeways themselves) | | | | | | | |
| f. General communications from MnDOT | | | | | | | |
| g. Addresing environmental issues | | | | | | | |
| h. Long term transportation planning (20 years) | | | | | | | |

**Now, looking at the above list, which 2 are <u>most</u> important factors for transportation?**

**_____ _____ (write in 2 letters from the list above, a-h)**

**18. How satisfied are you with the Minnesota Department of Transportation's performance in these transportation areas? (check one box per row)**

| | Very Satisfied | Somewhat Satisfied | Slightly Satisfied | Neither | Slightly Dissatisfied | Somewhat Dissatisfied | Very Dissatisfied |
|---|---|---|---|---|---|---|---|
| a. Your **ability** to get places you need & want to go | | | | | | | |
| b. The physical layout of the roadway system (including roads, signs & lights) | | | | | | | |
| c. The **ease** of getting to places you need & want to go | | | | | | | |
| d. Overall maintenance of the highway and freeways | | | | | | | |
| e. Safety of the roadways ( highways and freeways themselves) | | | | | | | |
| f. General communications from MnDOT | | | | | | | |
| g. Addressing environmental issues | | | | | | | |
| h. Long term transportation planning (20 years) | | | | | | | |

**19. Considering what you know about the Minnesota Department of Transportation overall, how satisfied are you with the services provided (check inside one box)?**

| Very Satisfied | Somewhat Satisfied | Slightly Satisfied | Neither | Slightly Dissatisfied | Somewhat Dissatisfied | Very Dissatisfied |
|---|---|---|---|---|---|---|
| | | | | | | |

**20. In the next 5-10 years, what are the 3 most important things that the Minnesota Department of Transportation should be working on?**

1. _____
2. _____
3. _____

**21. As you think about the next generation, what are the 3 most important things that the Minnesota Department of Transportation should be working on?**

1. _____
2. _____
3. _____

**22. Please indicate the extent of your agreement with the following statements about the Minnesota Department of Transportation. (check one box per row)**

| MnDOT… | Very Strongly Agree | Some-what Agree | Slightly Agree | Neither | Slightly Dis-agree | Some what Dis-agree | Very Strongly Dis-agree |
|---|---|---|---|---|---|---|---|
| Does what is best for Minnesota | | | | | | | |
| Acts in a financially responsible manner | | | | | | | |
| Considers customer concerns and needs when developing transportation plans | | | | | | | |
| Provides helpful and relevant information to citizens | | | | | | | |

*Finally, a few questions about you*

**23. What year were you born?** **19** ____ ____

**24. Are you…?** ☐ **Male** ☐ **Female** ☐ **Prefer not to answer**

**25. What is the highest level of education you have completed (check one)?**

☐ Some high school ☐ Graduated high school/GED ☐ Some vo-tech
☐ Graduated from vo-tech ☐ Completed associate degree ☐ Some college
☐ Graduated from college ☐ Some postgraduate ☐ Postgraduate

**26. In what ethnicity and race would you place yourself**?

**Ethnicity (check one):** ☐ Hispanic or Latino ☐ Not Hispanic or Latino

**Race (check all that apply):**

☐ American Indian or Alaska native ☐ Asian
☐ Black or African American ☐ Native Hawaiian/
☐ White Pacific Islander
☐ Other (Please specify_____)

**27. Including you, how many people live in your household?_____** People in household

**28. How many working automobiles are in your household? _____** Household autos

**29. Do you consider yourself a person with a disability?** ☐ Yes ☐ No

**30. What is your employment status (check one)?**

☐ Employed full time ☐ Employed part time ☐ Retired
☐ Student ☐ Unemployed ☐ Other_____

**31. Are you a current or former employee of the Minnesota Department of**

☐ ☐ **Transportation?** Yes No

**32. What is your annual household income before taxes (check one)?**

| | | |
|---|---|---|
| ☐ Less than $25,000 | ☐ $50,000-74,999 | ☐ $125,000-149,999 |
| ☐ $25,000-34,999 | ☐ $75,000-99,999 | ☐ $150,000-174,999 |
| ☐ $35,000-49,999 | ☐ $100,000 -124,999 | ☐ $175,000 or more |

**Please mail the completed questionnaire back in the postage-paid envelope provided.**

***THANK YOU FOR YOUR PARTICIPATION!***

***Questions? 612 624 2250; guoxx278@umn.edu***

115 Green Hall, 1530 Cleveland Avenue North, St. Paul, MN 55108-1027

# Appendix B
# Postcard reminder

Greetings!

We recently contacted you concerning your perceptions of Minnesota's transportation system. If you have already completed a questionnaire, accept our sincere thanks! If you've not already done so, please complete the questionnaire and return it by mail. For a replacement, email guoxx278@umn.edu or call 612.624.4280.

Your response will improve your future transportation services and inform transportation management: please reply today. Thank you so much!

Sincerely,

Ingrid E. Schneider, Ph.D.

# Appendix C
# Tables and Figures

List of Tables

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**Table 2.1**

***Significant predictors of quality of life in various studies, 2011***

| Author (Year) | Population | Variance explained ($R^2$) | Significant Predictors | Not significant predictor |
|---|---|---|---|---|
| London et al. (1977) | U.S. adults | .25 | Things done with family, Things done with friends, The work itself, and Pay, fringe benefits and security. | The people you work with, What it is like where you work, What you have available for doing your job, The people you see socially, The organizations you belong to, The sports and recreation facilities you yourself use, or would like to use, The entertainment you get from tv, radio, movies, and local events and places |
| Michalos and Zumbo, (1999) [a] | University clerical staff | .57 | Health, Financial security, Family relations, Job, Friendships, Housing, Recreation activity, Self-esteem, Transportation, and Education | Area lived in |
| | Rural seniors | .49 | Health, Financial security, Family relations, Friendships, Housing, Area lived in, Recreation activity, Religion, Self-esteem, Transportation, Government services, Living partner | - |
| | Eastern northern community | .53 | Health, Financial security, Family relations, Friendships, Housing, Area lived in, Recreation activity, Religion, Self-esteem, Transportation, Government services, Living partner | Job |
| | University of Guelph students | .53 | Health, Financial security, Job, Family relations, Friendships, Housing, Recreation activity, Self-esteem, Education | Area lived in, Religion, Transportation |
| | World sample of students | .49 | Health, Financial security, Family relations, Friendships, Housing, Area lived in, Recreation | Job, Religion |

| | | | | |
|---|---|---|---|---|
| | | | activity , Self-esteem, Transportation, Living partner, Education | |
| | Prince George residents in 1994 | .60 | Job, Friendships, Housing, Self-esteem, Government services, Living partner | Health, Financial security, Family relations, Area lived in, Recreation activity, Religion, Transportation, Education |
| | Prince George residents in 1997 | .64 | Financial security, Family relations, Job, Friendships, Self-esteem, Living partner | Health, Housing, Area lived in, Recreation activity, Religion, Transportation, Government services |
| Power et al. (1999)[b] | Seattle, WA | .75 | Physical domain, Psychological domain, Social relationships domain, Environment | - |
| Sirgy et al. (2000) | Communities from U.S. and Australia | .56 | Community, Family, Finances, Personal health, Leisure life, Spiritual life, | Job, Education, Friendship, Neighborhood, Environment, Housing, Cultural life, Social Status |
| Turksever and Atalik (2001) [b] | | .33 | Health, Climate, Crowding, Sporting, Housing conditions, Travel to work, Environmental pollution | Shopping facilities, Education provision, Cost of living, Noise levels, Job opportunities, Relation with neighbors, Parks and green areas, Leisure opportunities, Crime rate, Accessibility to public transportation, Traffic congestion |
| Senlier et al. (2009) | Turkish | .25 | Education facilities, Quality of environment, Safety, Public transport, Neighborhood | Social and cultural facilities, Sufficiency of health services, Quality of health services, |

*Note.* [a.] Michalos and Zumbo (1999) applied their simple linear QOL life model comprising fourteen items to various populations and obtained various predictive power and subset of items that were significant in explaining general QOL.

[b]. Power et al. (1999) also reported their study finding in other fourteen countries, including Japan, Israel, Australia, and U.K.

[c]. Turksever and Atalik (2001) reported regression model explaining QOL both at city level and at district level. The table presented the regression model at the city level.

**Table 2.2**

***Significant predictors of quality of life by different travel modes (Arlington County, 2007)***

| Travel Mode | Significant quality of life predictors |
|---|---|
| Drive alone | public education, transportation system and services, ease of getting around the area, entertainment and recreation opportunities, safety, attractive residential communities, the economy |
| Train | ease of getting around the area, public education, safety, entertainment and recreational opportunities, attractive residential communities, transportation system and services, diversity |
| Bus | ease of getting around the area, entertainment and recreation opportunities, public education, safety |
| Carpool /vanpool | ease of getting around the area, the economy, public education, attractive residential communities |
| Bike | job opportunities, transportation system and services, public education, ease of getting, and the economy |
| Walk | public education, ease of getting around the area, safety, transportation system and services, entertainment and recreational opportunities |

Note. Result from Arlington County. (2007). How much does transportation affect your life. Retrieved from Transportation Demand Management Research Center website: http://www.commuterpage.com/research/study_list.asp?jobID=ACCS016&studyID=91

**Table 2.3**

***Quality of life related performance measurement among departments of transportation, 2011***

| Agency | Quality of life related performance measurement |
|---|---|
| Connecticut Department of Transportation (2009) | Specific projects including Transit Oriented Development, Diesel Locomotive Initiatives; aviation enhancing quality of life (Bradley International Airport); airport noise mitigation; Bradley gong green; recycled construction and maintenance materials; improving winter highway maintenance; new M8 rail fleet; buses and bus facilities; congestion; traffic incident management; traffic management systems; bikeways, walkways and trails; business development program |
| Virginia Department of Transportation (Smith, 2009) | Tons per year of mobile source emissions; tons per year of mobile source greenhouse gas emissions; fuel usage per capita; acres of wetlands replaced. |
| Oregon Department of Transportation (Reif & Brian, 2005) | Transportation cost index |
| Arlington County Commuter Service (2007) | Ease of getting around without car, choice/variety of options, cost, time required to make trips, convenience, dependability, safety, comfort, Arlington County Commuter Service is meeting residents needs, ability to travel around AC, ease of getting around with car, ease of getting around by bus, ease of getting around by bicycle, ease of getting to other destinations without a car. |

**Table 3.1**
***Counties identified and regions used for data acquisition, Minnesota, 2011***

| Region | County |
|---|---|
| Central | Isanti, Sherburne, Stearns, Wright, Benton, Kanabec, Mille Lacs, Morrison |
| Metro | Chisago, Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, Washington |
| Northeast | Koochiching, Aitkin, Crow Wing, Itasca, Cook, Lake, St. Louis, Carlton, Pine |
| Northwest | Kittson, Marshall, Pennington, Red Lake, Roseau, Becker, Douglas, Otter Tail, Todd, Beltrami, Lake of the Woods, Cass, Clearwater, Hubbard, Wadena, Grant, Pope, Stevens, Clay, Mahnomen, Norman, Polk, Traverse, Wilkin |
| South | Dodge, Freeborn, Le Sueur, Mower, Rice, Steele, Waseca, Big Stone, Blue Earth, Brown, Chippewa, Cottonwood, Faribault, Jackson, Kandiyohi, Lac Qui Parle, Lincoln, Lyon, Martin, McLeod, Meeker, Murray, Nicollet, Nobles, Pipestone, Redwood, Renville, Rock, Sibley, Swift, Watonwan, Yellow Medicine, Fillmore, Goodhue, Houston, Olmsted, Wabasha, Winona |

**Table 3.2**

***Item and scale statistical summary for predictor variables, Minnesota, 2011***

| Scale | Questionnaire item number | # of Items | Scale Mean | Cronbach's Alpha |
|---|---|---|---|---|
| General transportation satisfaction | Q8 | 3 | 4.61 | .62 |
| Quality of life assessment | Q10 | 11 | 6.39 | .82 |
| Satisfaction with roadway design | Q11 | 9 | 4.78 | .83 |
| Evaluation of transportation and environmental related issues | Q12 | 6 | 3.16 | .85 |
| Evaluation of safety | Q13 & Q15 | 12 | 5.09 | .84 |
| Satisfaction with accessibility | Q14 | 11 | 4.94 | .87 |
| Satisfaction with mobility | Q14 | 7 | 4.98 | .83 |
| Satisfaction with maintenance | Q16 | 10 | 5.01 | .87 |
| Satisfaction with MnDOT transparency | Q20 | 4 | 5.11 | .90 |
| Importance of transportation areas | Q17 | 8 | 6.32 | .80 |
| Satisfaction with transportation areas | Q18 | 8 | 5.37 | .89 |

**Table 4.1**

***Response rate of quality of life and transportation survey, Minnesota 2011***

| Item | Number/% |
|---|---|
| Mailed questionnaires | 7,488 |
| Undeliverable | 175 |
| Deceased/changed address | 35 |
| Valid total | 7, 278 |
| Returned | |
| Received questionnaires | 3484 |
| Unusable | 176 |
| Valid response | 3308 |
| Valid response rate | 45.4% |

**Table 4.2**

***State population distribution compared to sample representation, Minnesota 2011***

| | Population Estimate 2009[a] | | Sample | |
|---|---|---|---|---|
| Region | N | % | N | % |
| State | 5,192,122 | 100 | 3308 | 100 |
| Metro | 2,932,301 | 56.5 | 1750 | 53.2 |
| South | 996,762 | 19.2 | 677 | 20.6 |
| Central | 511,961 | 9.9 | 286 | 8.7 |
| Northwest | 449,066 | 8.7 | 304 | 9.2 |
| Northeast | 410,852 | 7.9 | 272 | 8.3 |

*Note.* [a] cited from Minnesota State Demographic Center (2007)

**Table 4.3**

***Importance of various quality of life areas among Minnesotans, 2011***

| | State (n=3308) | | Metro (n=1750) | | Central (n=286) | | Northeast (n=272) | | Northwest (n=304) | | South (n=677) | | F statistic |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Life Area | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | |
| Health | 6.84 | 0.57 | 6.84 | 0.61 | 6.87 | 0.51 | 6.85 | 0.52 | 6.88 | 0.38 | 6.81 | 0.61 | 0.96 |
| Family, friends & neighbors | 6.71 | 0.72 | 6.72 | 0.73 | 6.77[a] | 0.58 | 6.60[a] | 0.83 | 6.77 | 0.52 | 6.68 | 0.78 | 2.9* |
| Safety & security | 6.71 | 0.73 | 6.72 | 0.70 | 6.79 | 0.53 | 6.62 | 0.88 | 6.68 | 0.83 | 6.7 | 0.74 | 2.2 |
| Housing | 6.53 | 0.92 | 6.57 | 0.87 | 6.54 | 0.86 | 6.42 | 1.04 | 6.45 | 1.07 | 6.49 | 0.93 | 2.9* |
| Environment | 6.41 | 1.01 | 6.44 | 0.96 | 6.5 | 0.88 | 6.32 | 1.14 | 6.41 | 1.10 | 6.36 | 1.09 | 1.73 |
| Employment/ finances | 6.39 | 1.13 | 6.43[a] | 1.12 | 6.38 | 1.15 | 6.17[ab] | 1.34 | 6.31 | 1.10 | 6.43[b] | 1.05 | 3.39** |
| Education | 6.22 | 1.29 | 6.26[a] | 1.27 | 6.22 | 1.21 | 6.00[a] | 1.43 | 6.25 | 1.36 | 6.26 | 1.25 | 3.34* |
| Local services & amenities | 6.18 | 0.98 | 6.20 | 0.99 | 6.16 | 0.88 | 6.14 | 1.00 | 6.19 | 1.02 | 6.17 | 0.97 | 0.36 |
| Transportation | 6.16 | 1.18 | 6.13 | 1.18 | 6.2 | 1.08 | 6.08 | 1.33 | 6.09 | 1.21 | 6.22 | 1.15 | 1.50 |
| Spirituality, faith & serenity | 6.10 | 1.36 | 5.97[a] | 1.46 | 6.31[ab] | 1.08 | 5.9[bcd] | 1.44 | 6.33[ac] | 1.20 | 6.31[ac] | 1.14 | 13.74*** |
| Recreation & entertainment | 6.06 | 1.06 | 6.10[ab] | 1.06 | 6.04 | 0.91 | 5.90[b] | 1.13 | 5.99 | 1.18 | 6.08[a] | 0.99 | 2.71* |

*Note.* Quality of life scale reliability strong: Cronbach $\alpha = .82$. Means with same superscripts are significantly different.

Importance of various areas to quality of life measured with 7 point scale: 1= Very unimportant; 2= Somewhat unimportant; 3= Slightly unimportant; 4=Neither; 5= Slightly important; 6= Somewhat important; 7= Very important. * p< .05 ** p< .01 ***p<.001

**Table 4.4**

***Stepwise regression analysis explaining the variance in quality of life among Minnesota residents, 2011***

| Life Areas | State [a] (n=3308) | | Metro [b] (n=1705) | | Central [c] (n=286) | | Northeast [d] (n=272) | | Northwest [e] (n=304) | | South [f] (n=677) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Beta | t-statistic | Beta | t-statistic | Beta | t-statistic | Beta | t-statistic | Beta | t-statistic | Beta | t-statistic |
| Health | .084 | 3.76*** | .127 | 4.36 *** | .142 | 2.10 * | | - | | - | | - |
| Recreation & entertainment | .081 | 3.74*** | .094 | 3.18 ** | | - | | - | .206 | 3.20 ** | .158 | 3.38** |
| Education | .081 | 3.90*** | .070 | 2.47 * | | - | | - | | - | .152 | 3.49** |
| Spirituality, faith & serenity | .059 | 2.96** | | - | | - | | - | | - | | - |
| Housing | .059 | 2.48* | | - | | - | | - | | - | | - |
| Transportation | -.046 | -2.13* | | - | | - | | - | | - | | - |
| Family, friends & neighbors | | - | | - | .165 | 2.44 * | .150 | 2.21 * | | - | | - |
| Safety & security | | - | | - | | - | | - | | - | .166 | 3.45 ** |
| Employment/ finances | | - | | - | | - | | - | | - | -.107 | -2.22 * |

*Note.* [a.] Adjusted R square= .048 (R square = .051), F(2,629)=23.363, p<.01;

[b.] Adjusted R square= .047 (R square = .049), F(1,402)=24.221, p<.01;

[c.] Adjusted R square= .054 (R square = .063), F(228)=7.617, p<.01;

[d.] Adjusted R square= .018 (R square = .022), F(214)=4.900, p<.05;

[e.] Adjusted R square= .038 (R square = .043), F(230)=10.221, p<.01;

[f.] Adjusted R square= .085 (R square = .092), F(530)=13.457, p<.001.

* p< .05, ** p< .01, ***p<.001;Only variable retained in final models

**Table 4.5**

***Stepwise regression analysis explaining the variance in quality of life among Minnesota residents of varying age groups, 2011***

| Life Area | Younger Group[a] (18-34) (n=149) | | Middle Group[b] (35-59) (n=1460) | | Older Group[c] (over 60) (n=1639) | |
|---|---|---|---|---|---|---|
| | Beta | t-statistic | Beta | t-statistic | Beta | t-statistic |
| Health | | - | .159 | 5.39*** | | - |
| Recreation & entertainment | .179 | 2.15 * | | - | .111 | 3.65*** |
| Education | | - | .140 | 4.83*** | 2.158 | 2.16 * |
| Spirituality, faith & serenity | | - | .105 | 3.67 *** | - | |
| Housing | | - | | - | .112 | 3.60 *** |
| Transportation | | - | -.060 | -2.07* | | - |
| Safety & security | .275 | 3.30 ** | | - | | - |

*Note.* [a.] Adjusted R square= .104 (R square = .118), F(129)=8.59, p<.01; [b.] Adjusted R square= .069 (R square = .072), F(1229)=23.966, p<.001; c. Adjusted R square= .045(R square = .047), F(1222)=20.240, p<.001;* p< .05, ** p< .01, ***p<.001

**Table 4.6**

***Stepwise regression analysis explaining the variance in quality of life for commuters and non-commuters in Minnesota, 2011***

| Life Area | Commuter[a] | | Non-commuter[b] | |
|---|---|---|---|---|
| | Beta | t-statistic | Beta | t-statistic |
| Health | .115 | 3.59*** | | - |
| Recreation & entertainment | .059 | 2.04* | .094 | 2.78** |
| Education | .097 | 3.63*** | .080 | 2.49* |
| Spirituality, faith & serenity | .062 | 2.41* | - | |
| Housing | .063 | 1.99* | - | |
| Safety & security | - | | .071 | 2.14* |
| Family, friends & neighbors | .061 | 1.97* | | |
| Employment and finances | -.097 | -3.44** | - | |

*Note.* a. Adjusted R square= .073 (R square = .077), F(1553)=18.62, p<.01;

b. Adjusted R square= 0.030 (R square = 0.032), F(1,041)=11.66, p<.01;

* p< .05 ** p< .01 ***p<.001; Only variables retained in final models

**Table 4.7**

***Stepwise regression analysis explaining the variance in quality of life among people with disabilities in Minnesota, 2011***

| Life Area | Beta | t-statistic |
|---|---|---|
| Employment and finances | .206 | 3.46** |

*Note.* Adjusted R square= .039 (R square = .042), F(271)=11.95, p<.01;

Only variable retained in final models

* p< .05 ** p< .01, ***p<.001

**Table 4.8**

***Stepwise regression analysis explaining satisfaction with MnDOT services, 2011***

| Transportation Areas | Beta | t-statistic |
|---|---|---|
| Accessibility | .133 | 6.91*** |
| Mobility | .044 | 2.05* |
| Maintenance | .268 | 14.67*** |
| Planning | .166 | 10.16*** |
| Design | .132 | 7.03*** |
| Safety | .113 | 5.96*** |
| Communications | .111 | 6.87*** |

**Table 4.9**

***Stepwise regression analysis explaining commuter satisfaction with MnDOT services, 2011***

| | Model | |
|---|---|---|
| Transportation area | Beta | t-statistic |
| Maintenance | .250 | 10.80*** |
| Planning | .179 | 8.58*** |
| Design | .154 | 6.39*** |
| Accessibility | .126 | 5.06*** |
| Communications | .119 | 5.76*** |
| Safety | .089 | 3.66*** |
| Mobility | .071 | 2.61** |

*Note.* [a.] Adjusted R square= .569 (R square = .571), F(1,666)=316.45, p<.001;

*; p< .05 **; p< .01 ***p<.001

**Table 4.10**

***Stepwise regression analysis explaining satisfaction with MnDOT services among people with disabilities, 2011***

| Transportation Area | Beta | t-statistic |
|---|---|---|
| Planning | .236 | 4.14*** |
| Safety | .214 | 3.90*** |
| Accessibility | .165 | 3.12** |
| Design | .139 | 2.40* |
| Communications | .137 | 2.30* |

*Note*. [a.] Dependent variable Adjusted R square= .481 (R square = .490), F(296)=56.77, p<.001;

* p< .05 ** p< .01 ***p<.001

**Table 4.11**

***Importance of transportation areas among Minnesota residents, 2011***

| Transportation Area | State (n=3215) | | Metro (n=1710) | | Central (n=280) | | Northeast (n=263) | | Northwest (n=294) | | South (n=652) | | F Statistic |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean[1] | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | |
| Accessibility | 6.78 | 0.61 | 6.79 | 0.61 | 6.81 | 0.57 | 6.79 | 0.69 | 6.78 | 0.61 | 6.76 | 0.55 | 0.37 |
| Safety | 6.72 | 0.67 | 6.71 | 0.70 | 6.72 | 0.64 | 6.76 | 0.65 | 6.72 | 0.71 | 6.73 | 0.58 | 0.37 |
| Maintenance | 6.63 | 0.71 | 6.63 | 0.71 | 6.59 | 0.69 | 6.73 | 0.64 | 6.67 | 0.80 | 6.66 | 0.63 | 1.59 |
| Mobility | 6.56 | 0.72 | 6.58 | 0.70 | 6.59 | 0.70 | 6.51 | 0.85 | 6.60 | 0.71 | 6.54 | 0.70 | 0.92 |
| Design | 6.36 | 0.89 | 6.34 | 0.91 | 6.37 | 0.84 | 6.37 | 0.93 | 6.40 | 0.91 | 6.40 | 0.79 | 0.66 |
| Planning | 6.13 | 1.17 | 6.19 | 1.13 | 6.11 | 1.14 | 6.15 | 1.18 | 6.02 | 1.19 | 6.13 | 1.14 | 1.69 |
| Environment | 5.76 | 1.34 | 5.77 | 1.37 | 5.81 | 1.28 | 5.84 | 1.32 | 5.79 | 1.27 | 5.76 | 1.28 | 0.26 |
| Communications | 5.60 | 1.29 | 5.54[a] | 1.29 | 5.55 | 1.27 | 5.58 | 1.36 | 5.76 | 1.31 | 5.74[a] | 1.20 | 4.01** |

*Note:* Importance of transportation areas measured with 7 point scale: 1= Very unimportant; 2= Somewhat unimportant; 3= Slightly unimportant; 4=Neither; 5= Slightly important; 6= Somewhat important; 7= Very important.

p<.01, * p< .05 , ***p<.001

Means with same superscripts are significantly different.

**Table 4.12**

***Analysis of variance comparing importance of transportation areas among age groups, 2011***

| | Younger 18-34 (n=148) | | Middle 35-59 (n=1429) | | Older 60+ (n=1599) | | F Statistic |
|---|---|---|---|---|---|---|---|
| | Mean[1] | SD | Mean | SD | Mean | SD | |
| Accessibility | 6.78 | 0.58 | 6.77 | 0.61 | 6.81 | 0.58 | 1.19 |
| Safety | 6.71 | 0.63 | 6.70 | 0.70 | 6.75 | 0.64 | 2.06 |
| Maintenance | 6.57 | 0.64 | 6.63 | 0.69 | 6.66 | 0.71 | 1.52 |
| Mobility | 6.51 | 0.71 | 6.53[a] | 0.73 | 6.62[a] | 0.69 | 6.54 ** |
| Design | 6.04[ab] | 1.03 | 6.27[ac] | 0.91 | 6.49[bc] | 0.83 | 35.09 *** |
| Planning | 6.12 | 1.16 | 6.19 | 1.12 | 6.13 | 1.17 | 1.69 |
| Environment | 5.79 | 1.34 | 5.71[a] | 1.37 | 5.84[a] | 1.30 | 3.65 * |
| Communications | 5.33[a] | 1.34 | 5.45[b] | 1.33 | 5.78[ab] | 1.22 | 27.86 *** |

*Note*. Importance of transportation areas measured with 7-point scale: 1=Very unimportant; 2=Somewhat unimportant; 3= Slightly unimportant; 4=Neither; 5= Slightly important; 6= Somewhat important; 7= Very important.

* p<.05, * * p< .01 ***p<.001

Means with same superscripts are significantly different.

**Table 4.13**

***Differences in importance of transportation areas between commuters and non-commuters in Minnesota, 2011***

| | Commuter (n=1806) | | Non-commuter (n=1353) | | t-statistic |
|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | |
| Accessibility | 6.79 | 0.60 | 6.79 | 0.60 | 0.07 |
| Safety | 6.71 | 0.68 | 6.74 | 0.64 | 1.57 |
| Maintenance | 6.63 | 0.70 | 6.65 | 0.71 | 1.07 |
| Mobility | 6.55 | 0.71 | 6.60 | 0.72 | 1.91 |
| Design | 6.30 | 0.90 | 6.45 | 0.86 | 4.83*** |
| Planning | 6.19 | 1.14 | 6.09 | 1.17 | -2.36* |
| Environment | 5.71 | 1.37 | 5.85 | 1.29 | 2.85** |
| Communications | 5.48 | 1.33 | 5.74 | 1.22 | 5.60*** |

*Note*. Importance of transportation areas measured with 7-point scale: 1=Very unimportant; 2=Somewhat unimportant; 3=Slightly unimportant; 4=Neither; 5=Slightly important; 6=Somewhat important; 7=Very important.

* p<.05, * * p< .01 ***p<.001

**Table 4.14**

***Satisfaction with transportation areas among Minnesota residents, 2011***

| | State (n=3215) | | Metro (M) (n=1710) | | Central (C) (n=280) | | Northeast (NE) (n=263) | | Northwest (NW) (n=294) | | South (S) (n=652) | | F statistic | Regional Difference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | | |
| Accessibility | 6.09 | 1.10 | 6.07 | 1.07 | 6.01 | 1.22 | 6.16 | 1.01 | 6.18 | 1.13 | 6.14 | 1.08 | 1.65 | No diff. |
| Mobility | 5.84 | 1.23 | 5.76 | 1.26 | 5.72 | 1.28 | 5.99 | 1.05 | 6.02 | 1.21 | 5.97 | 1.13 | 6.82*** | M < NE, NW & S; C < NW & S |
| Design | 5.79 | 1.23 | 5.73 | 1.26 | 5.67 | 1.28 | 5.96 | 0.97 | 5.96 | 1.21 | 5.89 | 1.16 | 5.48*** | M > all; C < NE/NW; |
| Safety | 5.53 | 1.39 | 5.49 | 1.38 | 5.41 | 1.41 | 5.55 | 1.34 | 5.79 | 1.31 | 5.58 | 1.44 | 3.48** | NW > M & C |
| Communications | 5.13 | 1.32 | 5.08 | 1.32 | 5.04 | 1.32 | 5.09 | 1.25 | 5.28 | 1.37 | 5.25 | 1.31 | 3.16* | S > M |
| Environment | 5.05 | 1.34 | 4.96 | 1.35 | 5.07 | 1.31 | 5.11 | 1.31 | 5.22 | 1.33 | 5.17 | 1.30 | 4.42** | M < NW & S |
| Maintenance | 4.89 | 1.75 | 4.77 | 1.78 | 4.85 | 1.69 | 4.84 | 1.76 | 5.41 | 1.55 | 5.01 | 1.73 | 9.49*** | NW > all; S > M |
| Planning | 4.63 | 1.62 | 4.49 | 1.67 | 4.61 | 1.62 | 4.75 | 1.43 | 4.96 | 1.55 | 4.84 | 1.54 | 9.38*** | NW > M & C; C > M |

*Note*. Satisfaction of transportation area measured with 7-point scale: 1=Very dissatisfied; 2=Somewhat dissatisfied; 3=Slightly dissatisfied; 4=Neither; 5=Slightly satisfied; 6=Somewhat satisfied; 7=Very satisfied. b. ANOVA was conducted to identify the importance differences among regions; * p< .05 ** p< .01 ***p<.001

**Table 4.15**

***Satisfaction with transportation areas among different age groups in Minnesota, 2011***

| | Younger 18-34 (n=148) | | Middle 35-39 (n=1429) | | Older 60+ (n=1599) | | F statistic |
|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | |
| Accessibility | 5.95[a] | 1.10 | 5.99[b] | 1.16 | 6.22[ab] | 1.02 | 17.62*** |
| Mobility | 5.52[a] | 1.28 | 5.67[b] | 1.30 | 6.04[ab] | 1.11 | 40.41*** |
| Design | 5.51[a] | 1.24 | 5.63[b] | 1.29 | 5.98[ab] | 1.12 | 36.22*** |
| Safety | 5.21[a] | 1.49 | 5.37[b] | 1.44 | 5.72[ab] | 1.31 | 27.66*** |
| Communications | 4.93[a] | 1.25 | 4.96[b] | 1.36 | 5.32[ab] | 1.28 | 30.13*** |
| Environment | 4.82[a] | 1.35 | 4.87[b] | 1.35 | 5.24[ab] | 1.31 | 30.91*** |
| Maintenance | 4.25[a] | 1.77 | 4.57[b] | 1.79 | 5.24[ab] | 1.64 | 67.66*** |
| Planning | 4.39[a] | 1.59 | 4.33[b] | 1.63 | 4.94[ab] | 1.56 | 55.09*** |

*Note*. Satisfaction of transportation areas measured with 7-point scale: 1=Very dissatisfied; 2=Somewhat dissatisfied; 3=Slightly dissatisfied; 4=Neither; 5=Slightly satisfied; 6=Somewhat satisfied; 7=Very satisfied.

* p<.05, * * p< .01 ***p<.001 Means with same superscripts are significantly different.

**Table 4.16**

***Differences in satisfaction with transportation areas between commuters and non-commuters in Minnesota, 2011***

| | Commuter (n=1806) | | Non-commuter (n=1353) | | t-statistic |
|---|---|---|---|---|---|
| | Mean[1] | SD | Mean | SD | |
| Accessibility | 6.02 | 1.14 | 6.18 | 1.04 | -4.04*** |
| Mobility | 5.71 | 1.29 | 6.00 | 1.23 | -6.72*** |
| Design | 5.67 | 1.28 | 5.95 | 1.12 | -6.37*** |
| Safety | 5.42 | 1.44 | 5.67 | 1.32 | -5.01*** |
| Communications | 5.00 | 1.35 | 5.31 | 1.25 | -6.44*** |
| Maintenance | 4.94 | 1.33 | 5.21 | 1.66 | -9.32*** |
| Environment | 4.63 | 1.78 | 5.19 | 1.33 | -5.34*** |
| Planning | 4.41 | 1.63 | 4.91 | 1.56 | -8.46*** |

*Note*. Satisfaction of transportation areas measured with 7-point scale: 1=Very dissatisfied; 2=Somewhat dissatisfied; 3=Slightly dissatisfied; 4=Neither; 5=Slightly satisfied; 6=Somewhat satisfied; 7=Very satisfied.

* p<.05, * * p< .01 ***p<.001

**Table 4.17.**

***Factor analysis of quality of life areas.***

| Factor 1 | Factor 2 | Factor 3 |
|---|---|---|
| Education | Health | Local services/ amenities |
| Environment | Family | Recreation |
| Employment | Friends | |
| Housing | | |
| Transportation | | |

**Table 4.18**

***Percent of open-ended respondents' ideas for short- and long-term MnDOT priorities, 2011.***

| Theme | Subtheme | MnDOT focus near term | Near term rank | MnDOT focus long term | Long term rank |
|---|---|---|---|---|---|
| **Maintenance** | | **34.94%** | **1** | **21.67%** | **2** |
| | Roads/general | 27.30 | | 16.77 | |
| | Bridges | 3.56 | | 2.47 | |
| | Snow/ice removal | 3.17 | | 1.67 | |
| | Other | 0.57 | | 0.12 | |
| | Efficiency | 0.34 | | 0.65 | |
| **Access** | | **19.17%** | **2** | **25.8%** | **1** |
| | Public transportation | 12.63 | | 17.40 | |
| | General (new routes, new bridges, etc) | 3.10 | | 3.95 | |
| | Non-motorized transportation | 2.71 | | 3.07 | |
| | Services (carpool lanes, park & rides, etc.) | 0.66 | | 0.93 | |
| | Other | 0.07 | | 0.45 | |
| **Safety** | | **12.18%** | **3** | **15.18%** | **3** |
| | General | 8.51 | | 9.8 | |
| | Speed | 1.20 | | 1.47 | |
| | Bikes & pedestrians | 0.66 | | 0.50 | |
| | Distracted driving | 0.60 | | 1.07 | |
| | Regulation/enforcement | 0.57 | | 0.73 | |
| | Education | 0.51 | | 1.15 | |
| | Other | 0.12 | | 0.40 | |
| **Mobility** | | **11.40%** | **4** | **8.58%** | **5** |
| | Traffic flow and congestion | 10.33 | | 7.90 | |
| | Construction | 0.62 | | 0.22 | |
| | Other | 0.28 | | 0.07 | |
| | Commute/travel time | 0.18 | | 0.40 | |
| **Design** | | **9.02%** | **5** | **7.85%** | **6** |
| | Signage | 2.26 | | 1.48 | |
| | Specific features | 2.04 | | 2.15 | |
| | Lights | 1.88 | | 1.00 | |
| | Quality | 1.50 | | 1.82 | |
| | Road material | 1.35 | | 1.40 | |

| | | | | | |
|---|---|---|---|---|---|
| **Communication** | | **8.02%** | **6** | **10.52%** | **4** |
| | Planning | 3.08 | | 4.83 | |
| | Finances | 2.76 | | 4.55 | |
| | Organization (hiring, urban v. rural, etc.) | 1.38 | | 0.28 | |
| | Other | 0.43 | | 0.28 | |
| | Communication | 0.40 | | 0.57 | |
| **Environment** | | **3.73%** | **7** | **7.57%** | **7** |
| | General | 2.07 | | 4.22 | |
| | Reduce run-off | 0.50 | | 0.48 | |
| | Other | 0.48 | | 0.68 | |
| | Air | 0.25 | | 0.70 | |
| | Fuel alternative/efficiencies | 0.23 | | 0.93 | |
| | Reduce car use | 0.19 | | 0.55 | |
| **Other** | **Other** | **1.53%** | | **2.83%** | |

**Table 4.19.**

***Demographics of respondents to transportation and quality of life questionnaire in Minnesota, 2011***

| | State | Metro | Central | Northeast | Northwest | South |
|---|---|---|---|---|---|---|
| | % (n) | % (n) | % (n) | % (n) | % (n) | % (n) |
| Gender | | | | | | |
| Male | 67.0 (2191) | 64.8 (1120) | 73.1 (207) | 64.3 (173) | 69.2 (209) | 70.1 (470) |
| Female | 31.9 (1043) | 34.1 (590) | 26.1 (74) | 33.5 (90) | 29.5 (89) | 29.4 (197) |
| Prefer not to respond | 1.1 (36) | 1.1 (19) | 0.7 (2) | 2.2 (6) | 1.3 (4) | 0.4 (3) |
| Total | 100 (3270) | 100 (1729) | 100 (283) | 100 (269) | 100 (302) | 100 (670) |
| Ethnicity | | | | | | |
| Non-Hispanic/ Non-Latino | 98.8 (2661) | 98.6 (1406) | 98.6 (219) | 99.2 (236) | 98.4 (239) | 99.5 (549) |
| Hispanic/Latino | 1.2 (32) | 1.4 (20) | 1.4 (3) | 0.8 (2) | 1.6 (4) | 0.5 (3) |
| Total | 100 (2693) | 100 (1426) | 100 (222) | 100 (238) | 100 (243) | 100 (552) |
| Race | | | | | | |
| White | 94.3 (3120) | 92.8 (1624) | 95.8 (274) | 96.7 (263) | 95.4 (290) | 96.8 (655) |
| Asian | 1.2 (39) | 2.0 (35) | - | - | 0.3 (1) | 0.4 (3) |
| American Indian/ Alaskan native | 1.0 (33) | 0.7 (13) | 1.7 (5) | 1.8 (5) | 2.0 (6) | 0.6 (4) |
| Other | 1.0 (32) | 1.0 (17) | 1.0 (3) | 1.1 (3) | 2.3 (7) | 0.3 (2) |
| Black/ African American | 0.8 (27) | 1.4 (24) | - | 0.7 (2) | - | 0.1 (1) |
| Native Hawaiian/ Pacific Islander | 0.1 (3) | 0.1 (2) | - | - | - | 0.1 (1) |
| Total | N/A | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Age | | | | | | |
| 18-30 | 1.8 (60) | 2.2 (37) | 1.4 (4) | 2.6 (7) | 1.7 (5) | 1.1 (7) |
| 31-40 | 8.3 (268) | 9.2 (158) | 10.3 (29) | 5.6 (15) | 6.0 (18) | 6.9 (46) |
| 41-50 | 16.7 (543) | 18.1 (311) | 19.9 (56) | 13.0 (35) | 12.7 (38) | 15.5 (103) |
| 51-60 | 25.1 (815) | 25.7 (441) | 26.2 (74) | 23.0 (62) | 23.1 (69) | 24.0 (160) |
| 61-70 | 23.5 (762) | 22.9 (394) | 23.4 (66) | 24.9 (67) | 22.1 (66) | 25.1 (167) |
| 71 or older | 24.6 (800) | 21.9 (376) | 18.8 (53) | 30.9 (83) | 34.4 (103) | 27.5 (183) |
| Total | 100 (3248) | 100 (1717) | 100 (282) | 100 (269) | 100 (299) | 100 (666) |
| Annual household income (U.S. Dollars) | | | | | | |
| Less than $25,000 | 12.9 (384) | 10.0( 158) | 12.8 (34) | 17.7 (44) | 21.7 (59) | 14.5 (88) |
| $25,000-34,999 | 10.6 (318) | 8.3 (132) | 10.2 (27) | 12.5 (31) | 13.6 (37) | 14.8 (90) |
| $35,000-49,999 | 15.2 (454) | 14.0 (221) | 17.0 (45) | 20.2 (50) | 19.1 (52) | 13.5 (82) |
| $50,000-74,999 | 21.1 (631) | 19.4 (307) | 25.3 (67) | 21.0 (52) | 21.0 (57) | 24.2 (147) |
| $75,000-99,999 | 14.6 (437) | 15.3 (242) | 13.6 (36) | 9.7 (24) | 11.0 (30) | 17.0 (103) |
| $100,000-124,999 | 11.2 (334) | 12.8 (202) | 12.1 (32) | 12.9 (32) | 5.9 (16) | 8.4 (51) |
| $125,000-149,999 | 5.0 (149) | 6.3 (99) | 4.2 (11) | 2.8 (7) | 2.9 (8) | 3.6 (22) |
| $150,000-174,999 | 3.2 (95) | 4.7 (75) | 1.1 (3) | 0.4 (1) | 1.1 (3) | 2.0 (12) |
| $175,000 or More | 6.2 (186) | 9.2 (146) | 3.8 (10) | 2.8 (7) | 3.7 (10) | 2.0 (12) |
| Total | 100 (2988) | 100 (1582) | 100 (265) | 100 (248) | 100 (272) | 100 (607) |
| Highest level of education | | | | | | |
| Some high school | 2.9 (87) | 1.7 (26) | 5.0 (13) | 3.0 (7) | 5.1 (14) | 4.4 (27) |
| Graduated high school/GED | 18.4 (547) | 13.0 (204) | 21.8 (57) | 19.8 (47) | 27.3 (75) | 26.6 (164) |
| Some votech | 2.7 (81) | 2.8 (44) | 2.7 (7) | 3.4 (8) | 2.9 (8) | 2.3 (14) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Graduated from votech | 10.8 (320) | 7.7 (121) | 16.5 (43) | 13.5 (32) | 13.5 (37) | 13.6 (84) |
| Completed associate degree | 5.3 (156) | 6.2 (98) | 6.5 (17) | 2.1 (5) | 3.3 (9) | 4.1 (25) |
| Some college | 12.8 (381) | 12.9 (203) | 10.3 (27) | 19.0 (45) | 15.6 (43) | 9.7 (60) |
| Graduated from college | 24.9 (739) | 29.1 (457) | 20.7 (54) | 16.0 (38) | 18.2 (50) | 22.5 (139) |
| Some postgraduate | 5.1 (152) | 5.5 (86) | 3.8 (10) | 7.6 (18) | 4.0 (11) | 4.4 (27) |
| Postgraduate degree(s) | 17.1 (508) | 21.0 (330) | 12.6 (33) | 15.6 (37) | 10.2 (28) | 12.5 (77) |
| Total | 100 (2971) | 100 (1569) | 100 (261) | 100 (237) | 100 (275) | 100 (617) |
| Employment | | | | | | |
| Employed full time | 52.2 (1683) | 55.8 (953) | 56.4 (158) | 34.8 (93) | 43.1 (129) | 51.6 (338) |
| Retired | 36.1 (1164) | 32.0 (546) | 33.9 (95) | 49.4(132) | 47.2 (141) | 37.9 (248) |
| Employed part time | 6.7 (215) | 6.1(104) | 5.7 (16) | 12.0(32) | 6.4 (19) | 6.6 (43) |
| Unemployed | 2.4 (77) | 3.2 (55) | 1.8 (5) | 0.7 (2) | 1.7 (5) | 1.4 (9) |
| Other | 1.3 (42) | 1.6 (27) | 0.7(2) | 0.4 (1) | 0.7 (2) | 0.8 (5) |
| Self-employed | 1.1 (36) | 1.0 (17) | 1.1 (3) | 1.1 (3) | 0.7 (2) | 1.5 (10) |
| Student | 0.3 (9) | 0.4 (6) | 0.4 (1) | 1.9 (5) | 1.0 (3) | 0.3 (2) |
| Total | 100 (3226) | 100 (1708) | 100 (280) | 100 (267) | 100 (299) | 100 (655) |

*Note*[a] Due to possible selection of multiple categorical responses total does not equal 100.

**Table 4.20**

***Residential experience among respondents to questionnaire, 2011***

| | State | | Metro | | Central | | Northeast | | Northwest | | South | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Years lived in Minnesota | 49.12 | 20.18 | 47.01 | 19.96 | 49.37 | 18.82 | 53.03 | 18.67 | 51.18 | 21.43 | 51.94 | 20.84 |
| Years lived in this community | 29.77 | 20.17 | 26.47 | 18.16 | 28.59 | 19.55 | 33.46 | 20.09 | 33.2 | 22.00 | 35.69 | 22.20 |
| Number of months in community | 11.7 | 1.22 | 11.75 | 1.08 | 11.73 | 1.27 | 11.57 | 1.44 | 11.4 | 1.84 | 11.72 | 1.11 |

**Table 4.21**

***Frequency of travel modes for various trip purposes in Minnesota, 2011***

| | Travel Mode | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Drive Alone | Car-pool | Bus (Public) | Metro Trains (Light Rail or Commuter Rail) | Bike | Walk | Taxi / Shuttle | Tele-commute (working from a remote location) |
| **Trip Purpose** | %(n) | %(n) | %(n) | %(n) | %(n) | %(n) | %(n) | %(n) |
| To/from work (n=2384) | 77.56(1849) | 5.87(140) | 3.65(87) | 0.88(21) | 3.94(94) | 3.48(83) | 0.34(8) | 4.28(102) |
| To/from school (n=260) | 60.77(158) | 18.08(47) | 6.92(18) | 0.38(1) | 3.85(10) | 7.31(19) | 0.38(1) | 2.31(6) |
| Shopping or errands (n=3715) | 75.56(2807) | 12.17(452) | 1.40(52) | 0.35(13) | 3.74(139) | 6.46(240) | 0.32(12) | - |
| Recreation, entertainment or meals (n=3907) | 57.23(2236) | 23.80(930) | 1.33(52) | 1.69(66) | 6.48(253) | 8.80(344) | 0.67(26) | - |
| Other/Specify/Various (n=199) | 56.78(113) | 14.57(29) | 4.02(8) | 8.04(16) | 5.53(11) | 6.53(13) | 4.52(9) | - |
| Medical (n=69) | 63.24(43) | 10.29(7) | 14.71(10) | 4.41(3) | - | 2.94(2) | 4.41(3) | - |
| Volunteer (n=27) | 92.59(25) | 3.70(1) | - | - | 3.70(1) | - | - | - |
| Church (n=90) | 68.89(62) | 24.44(22) | 1.11(1) | - | 1.11(1) | 2.22(2) | 2.22(2) | - |

**Table 4.22**

***Commute travel frequency and length among respondents to questionnaire, 2011***

| | State | | Metro | | Central | | Northeast | | Northwest | | South | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| How many days a week do you travel to/from work Monday - Friday | 4.84 | 0.75 | 4.83 | 0.71 | 4.92 | 0.64 | 4.62 | 0.98 | 5.07 | 0.68 | 4.84 | 0.81 |
| Approximately how many miles is your trip one way | 14.44 | 13.26 | 14.03 | 10.25 | 21.45 | 17.02 | 12.46 | 15.16 | 14.65 | 16.68 | 13.03 | 15.69 |

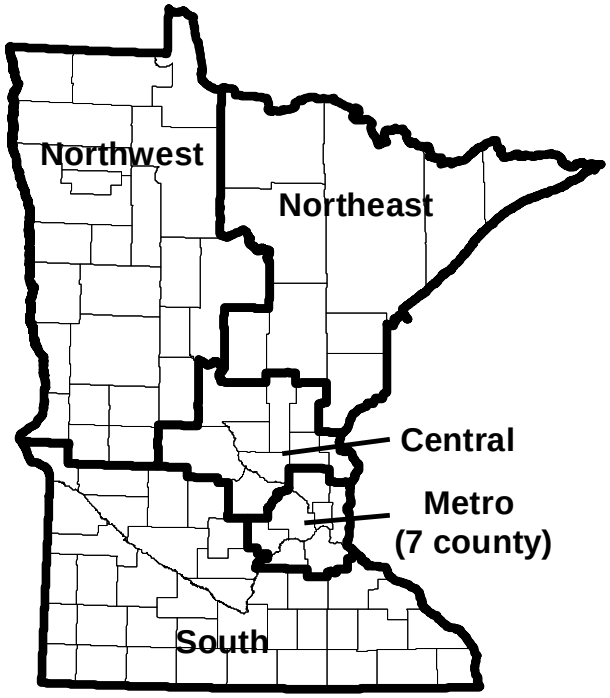


***Figure 3.1.*** **Regions identified and used for data acquisition and analysis.**

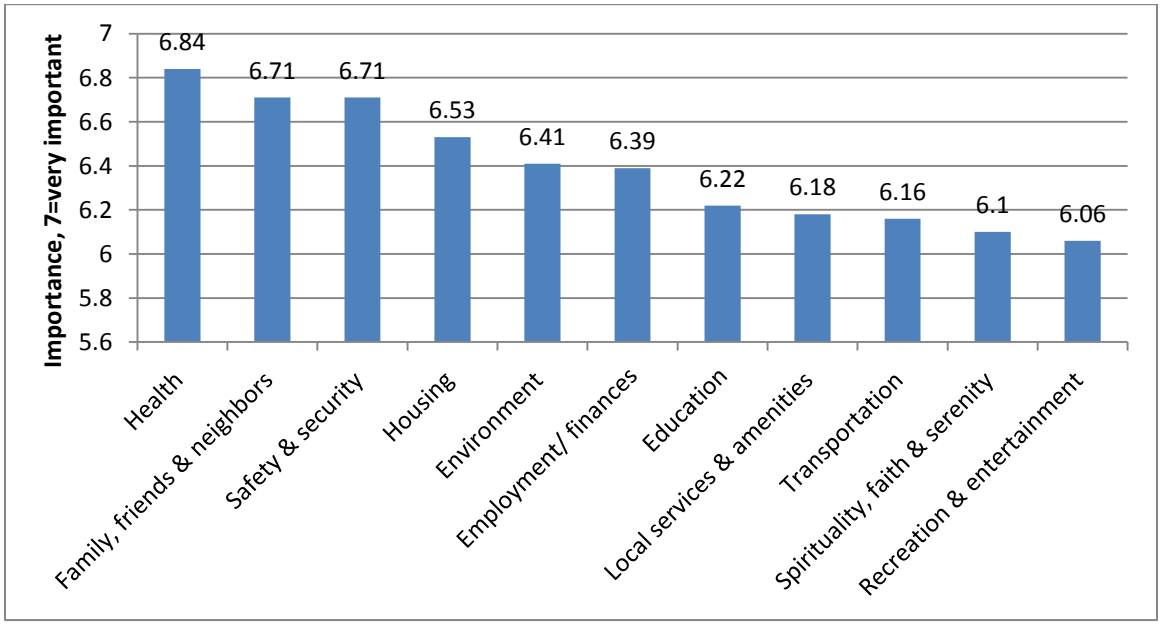


***Figure 4.1.*** **Mean importance of quality of life areas among Minnesotans, 2011.**

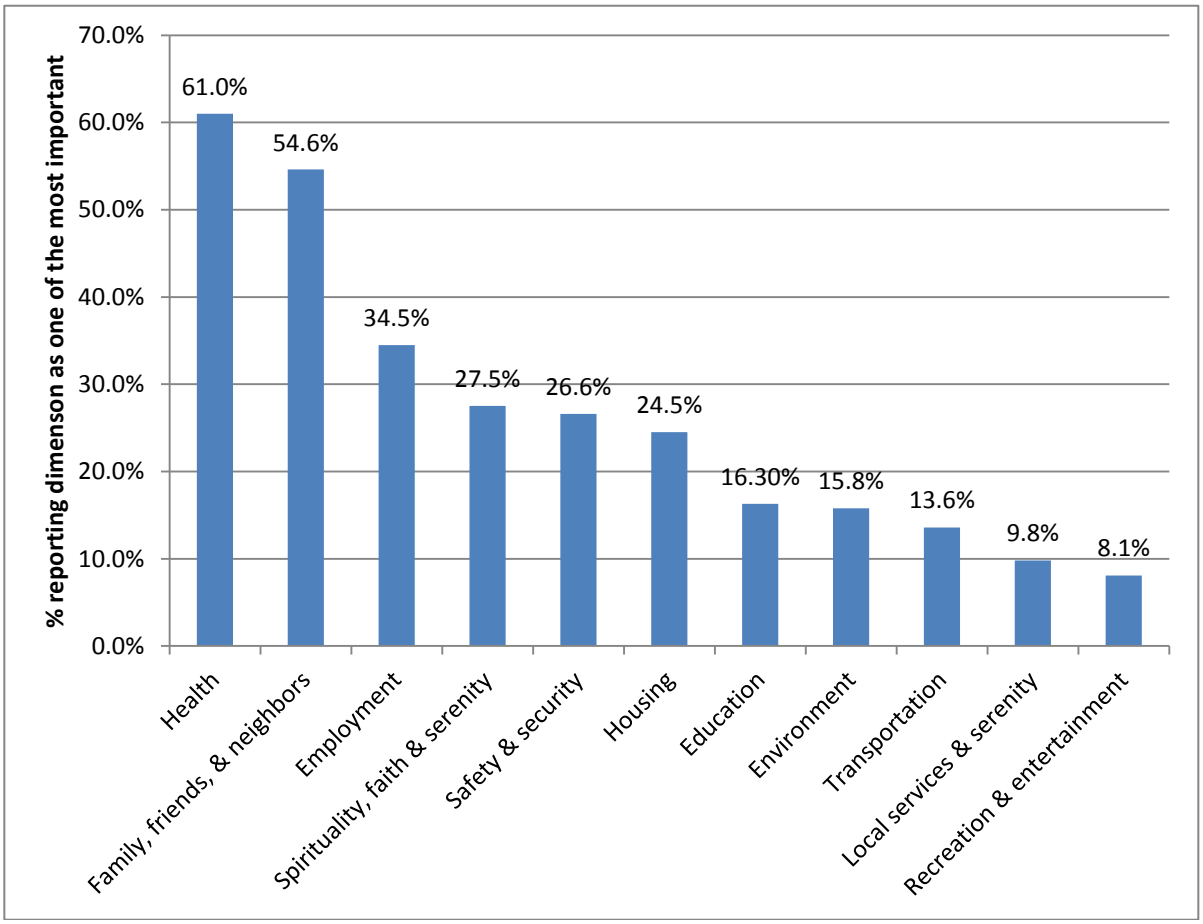


***Figure 4.2.*** **Percent of respondents reporting life area as one of three most important.**

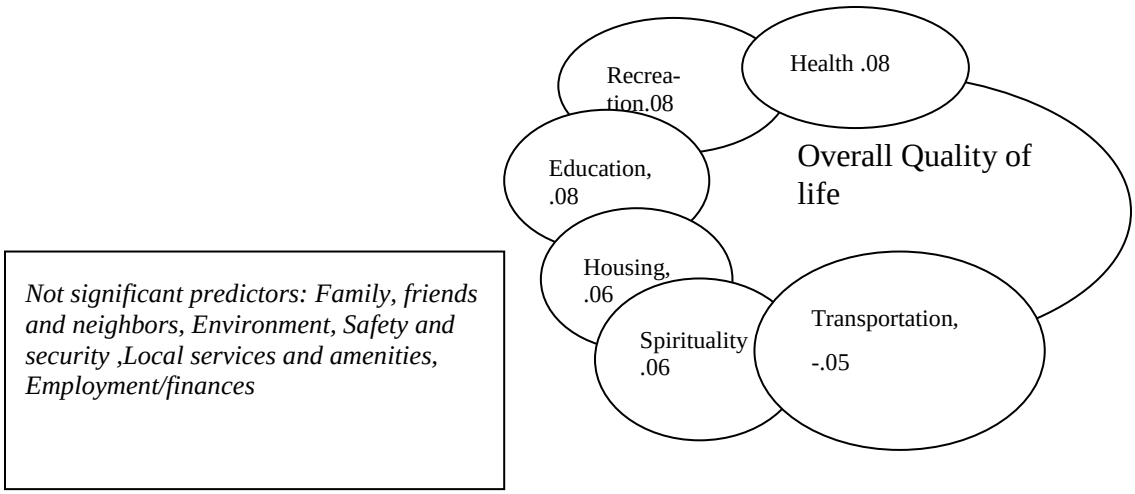


***Figure 4.3.*** **Diagram illustrating relative contribution of various life dimensions to explain overall quality of life among Minnesotans, 2011.**

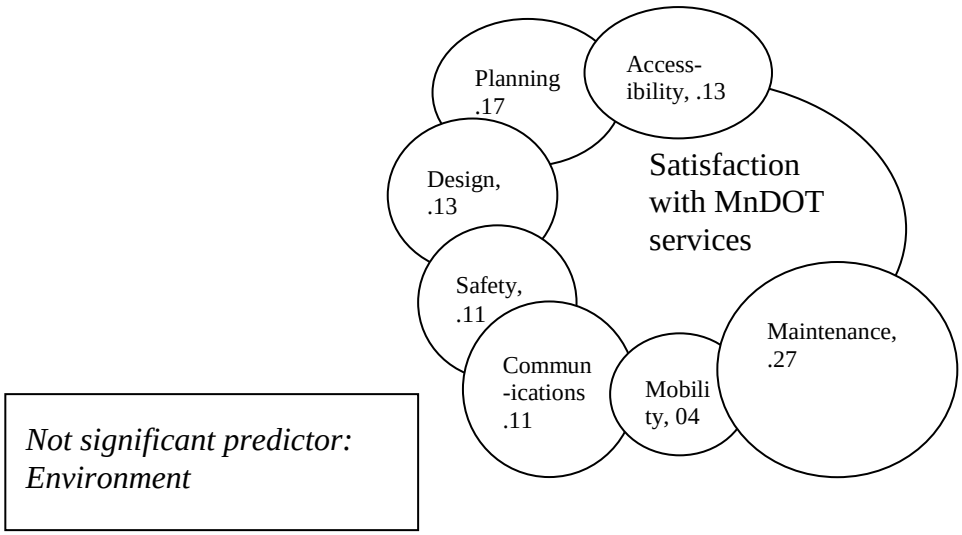


***Figure 4.4.*** **Diagram illustrating relative contribution of various transportation areas to explain satisfaction with MnDOT services among Minnesotans, 2011.**

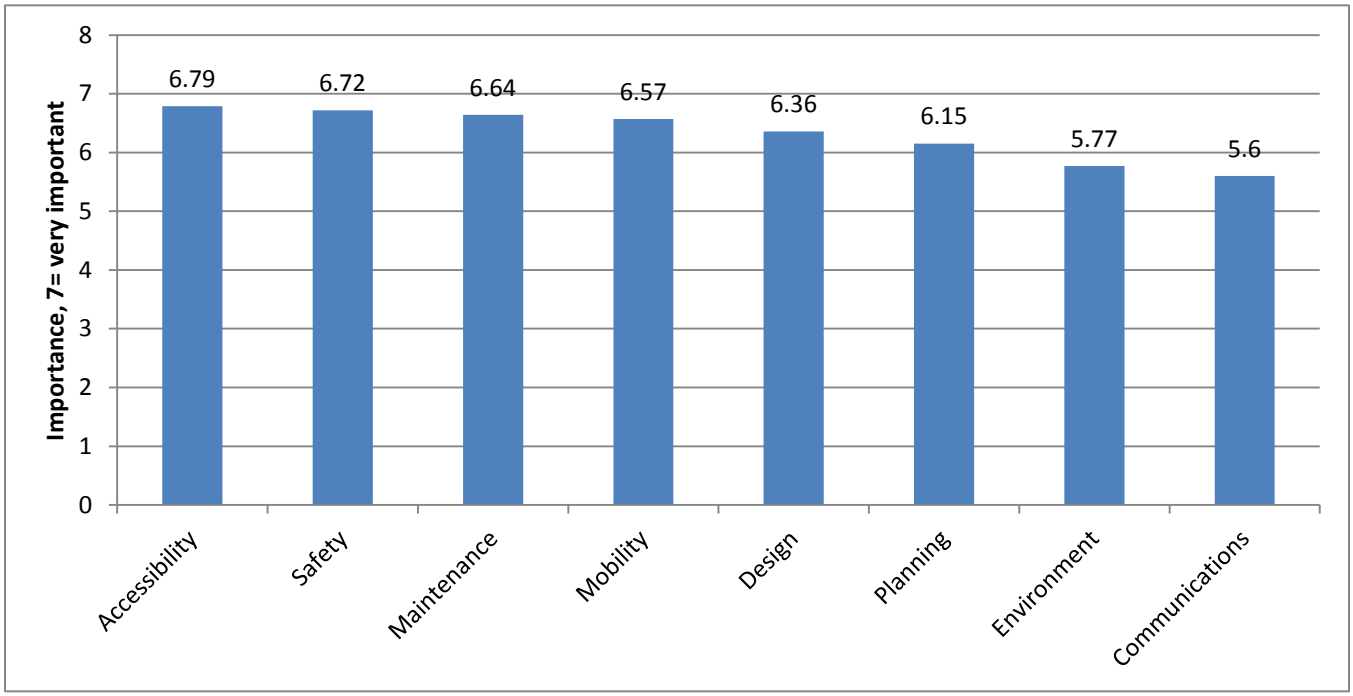


***Figure 4.5.*** **Importance of transportation areas among Minnesota residents, 2011.**

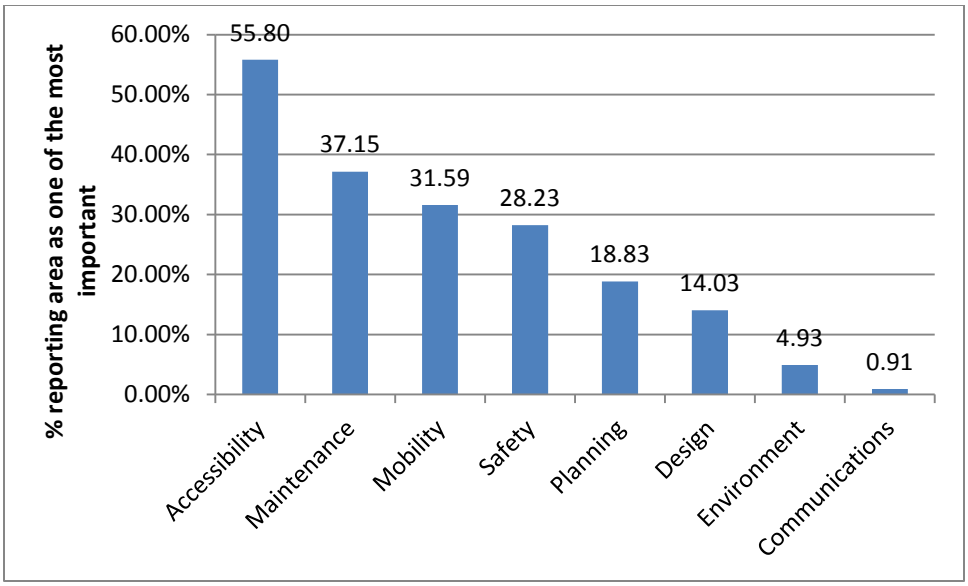


***Figure 4.6.*** **Qualitative assessment of most important transportation areas in Minnesota, 2011.**

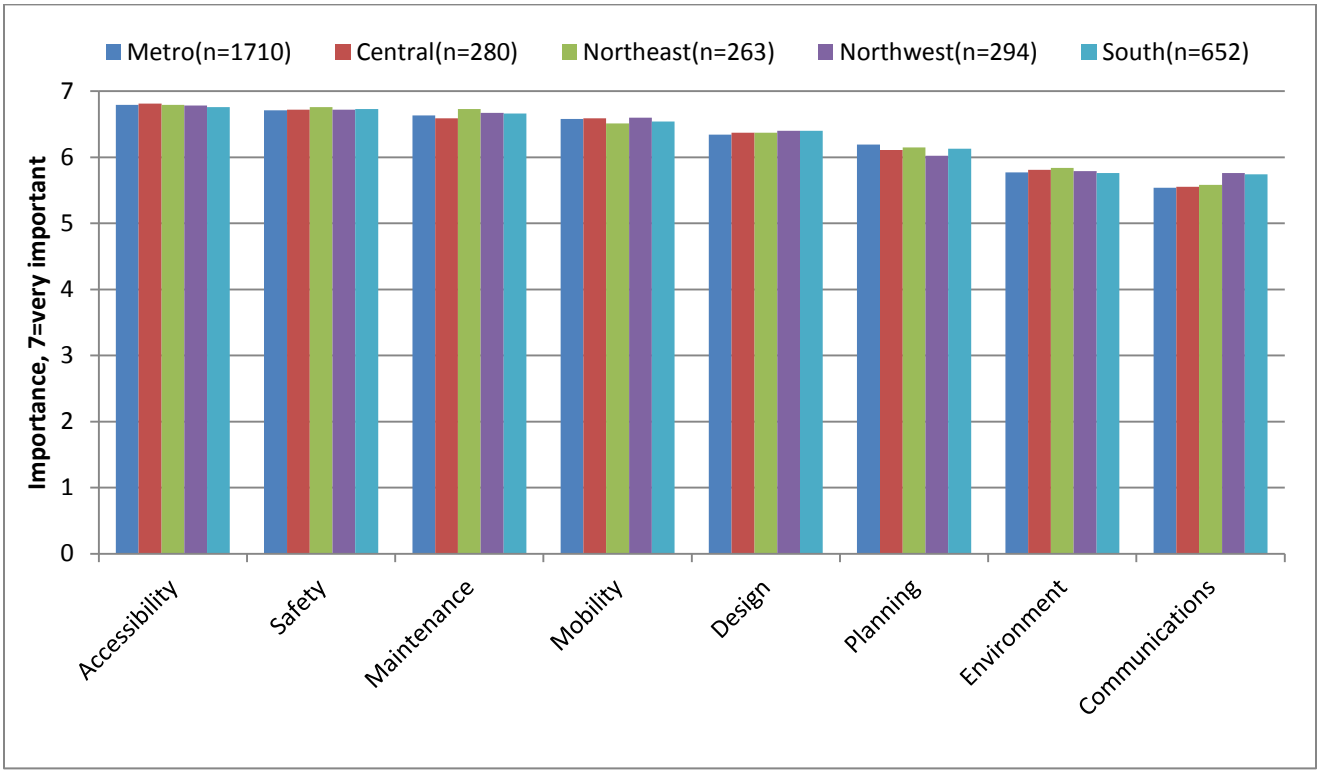


***Figure 4.7.*** **Importance of transportation areas by region, Minnesota 2011.**

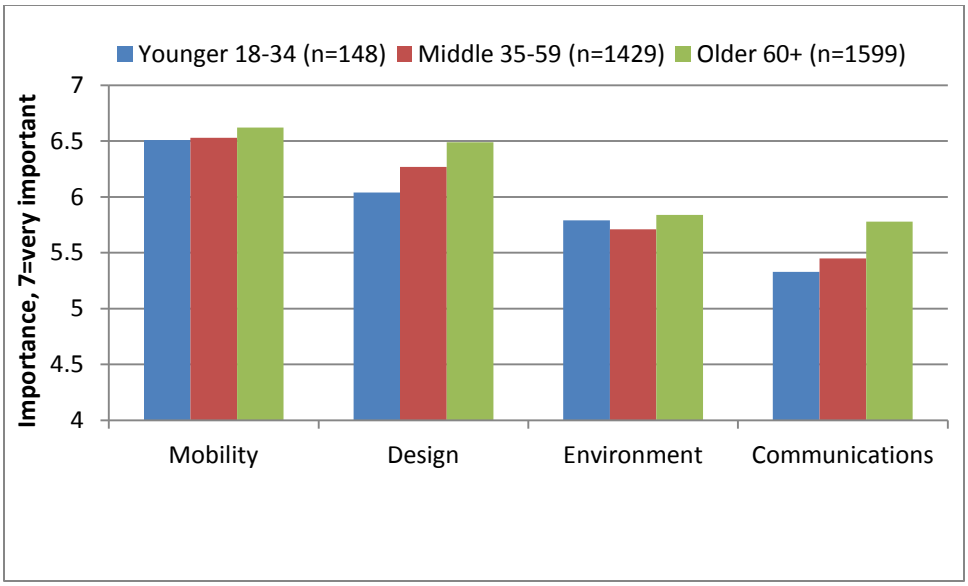


***Figure 4.8.*** **Differences in importance of transportation areas by age groups in Minnesota 2011.**

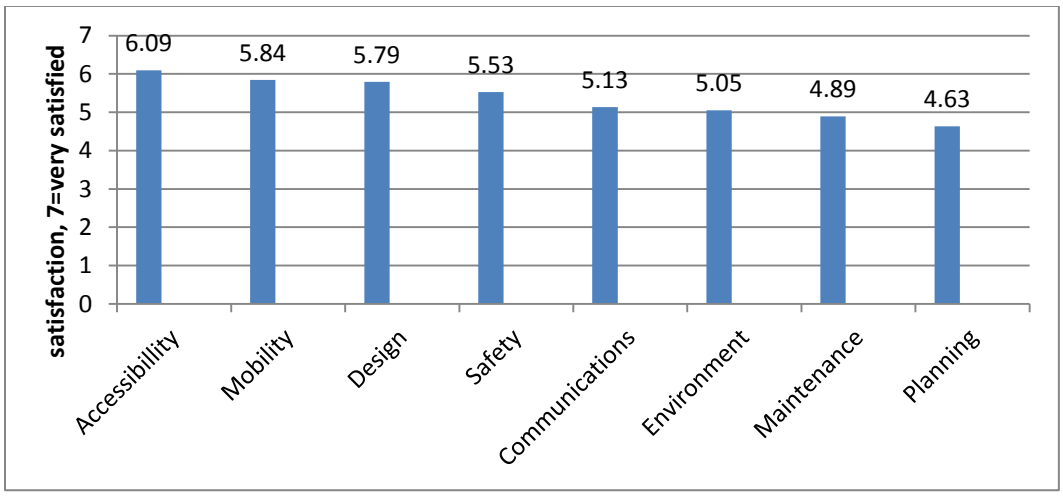


***Figure 4.9.*** **Satisfaction with transportation areas among Minnesota residents, 2011.**

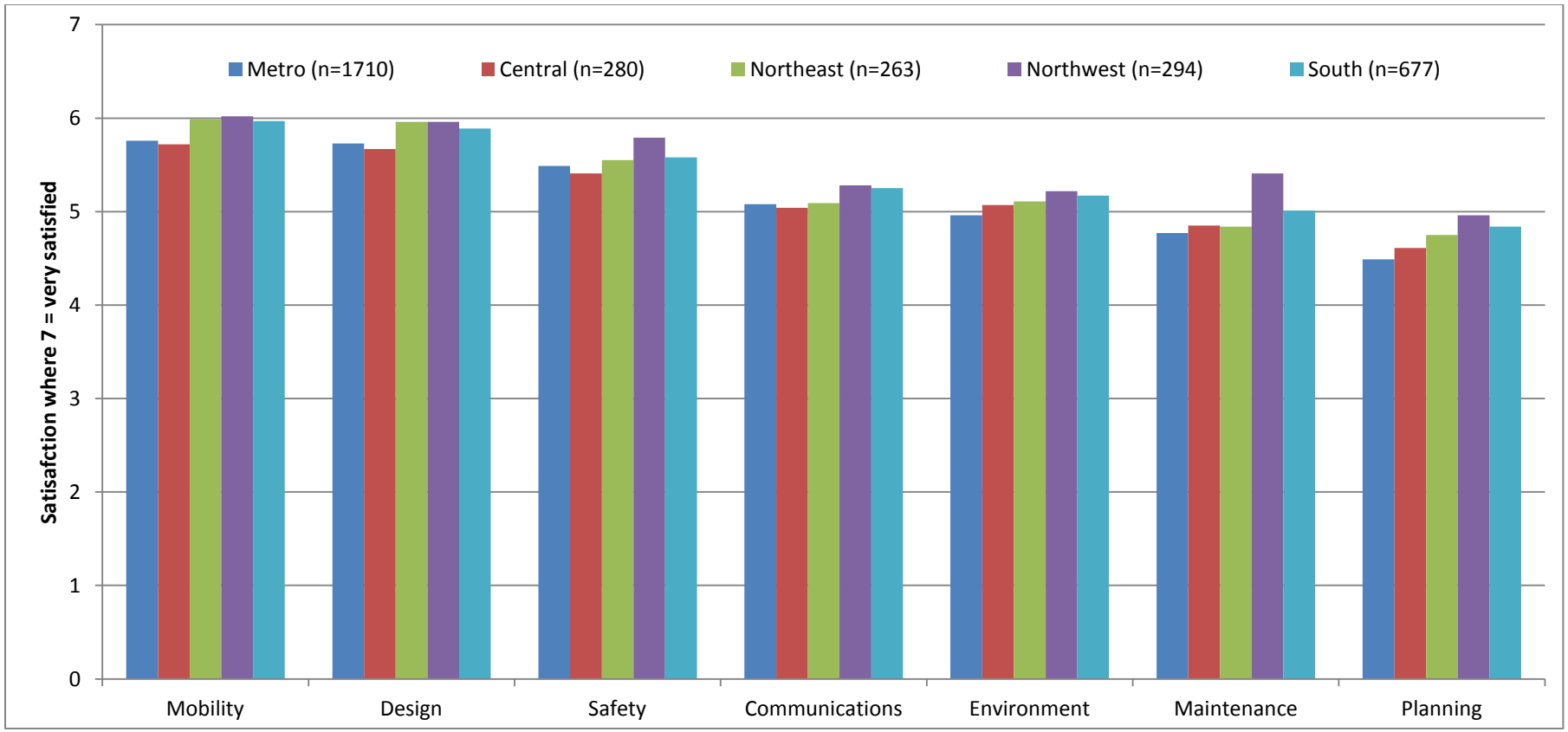


***Figure 4.10.*** **Differences in satisfaction with transportation areas by regional residence among Minnesotans, 2011.**

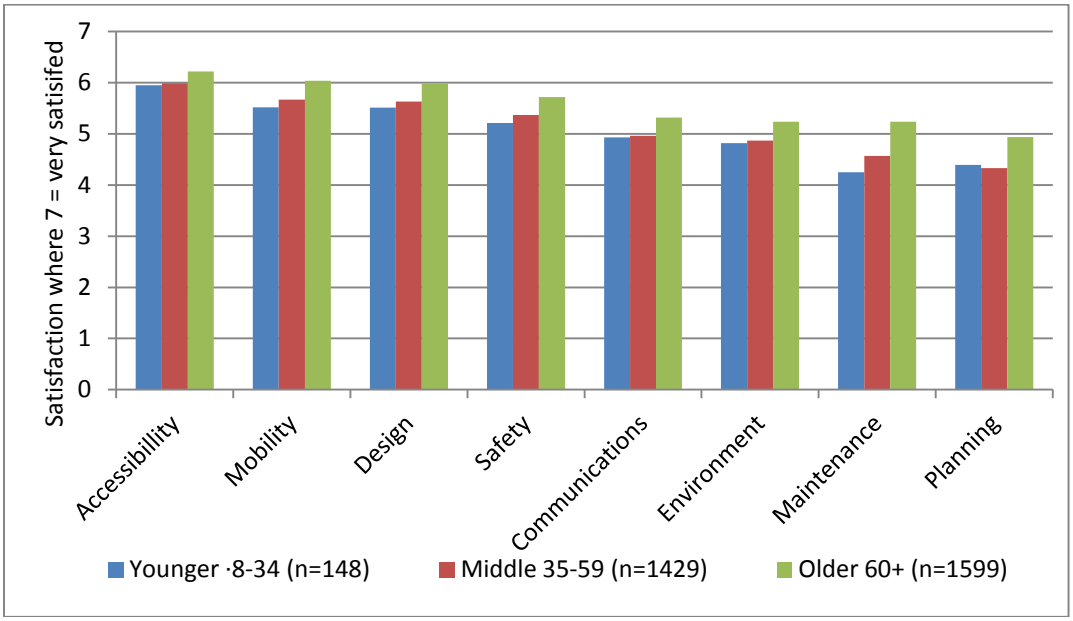


***Figure 4.11.*** **Differences in satisfaction with transportation areas by age group among Minnesota residents, 2011.**

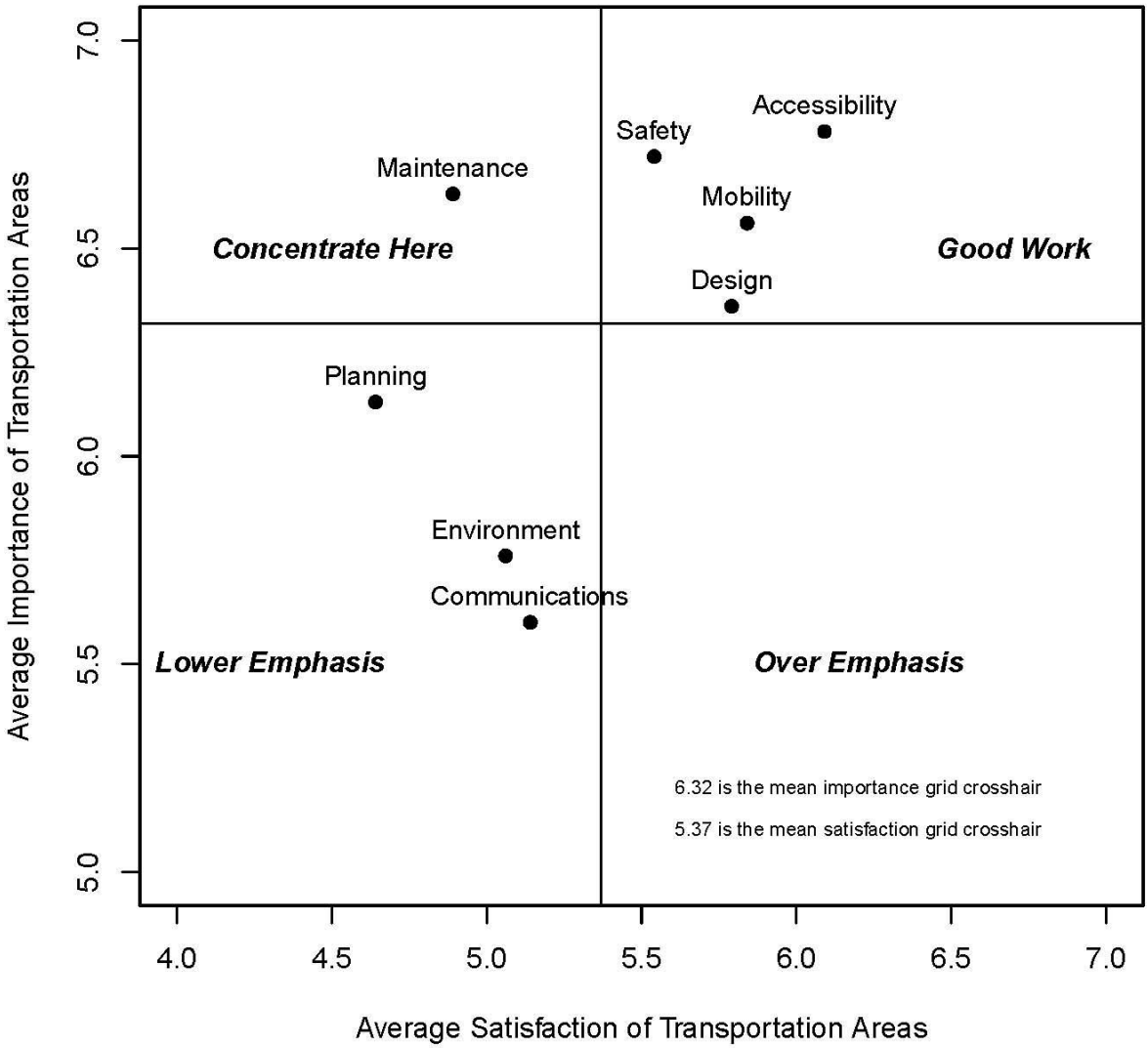


***Figure 4.12.*** **Importance and performance analysis plot of transportation areas among Minnesota residents, 2011.**

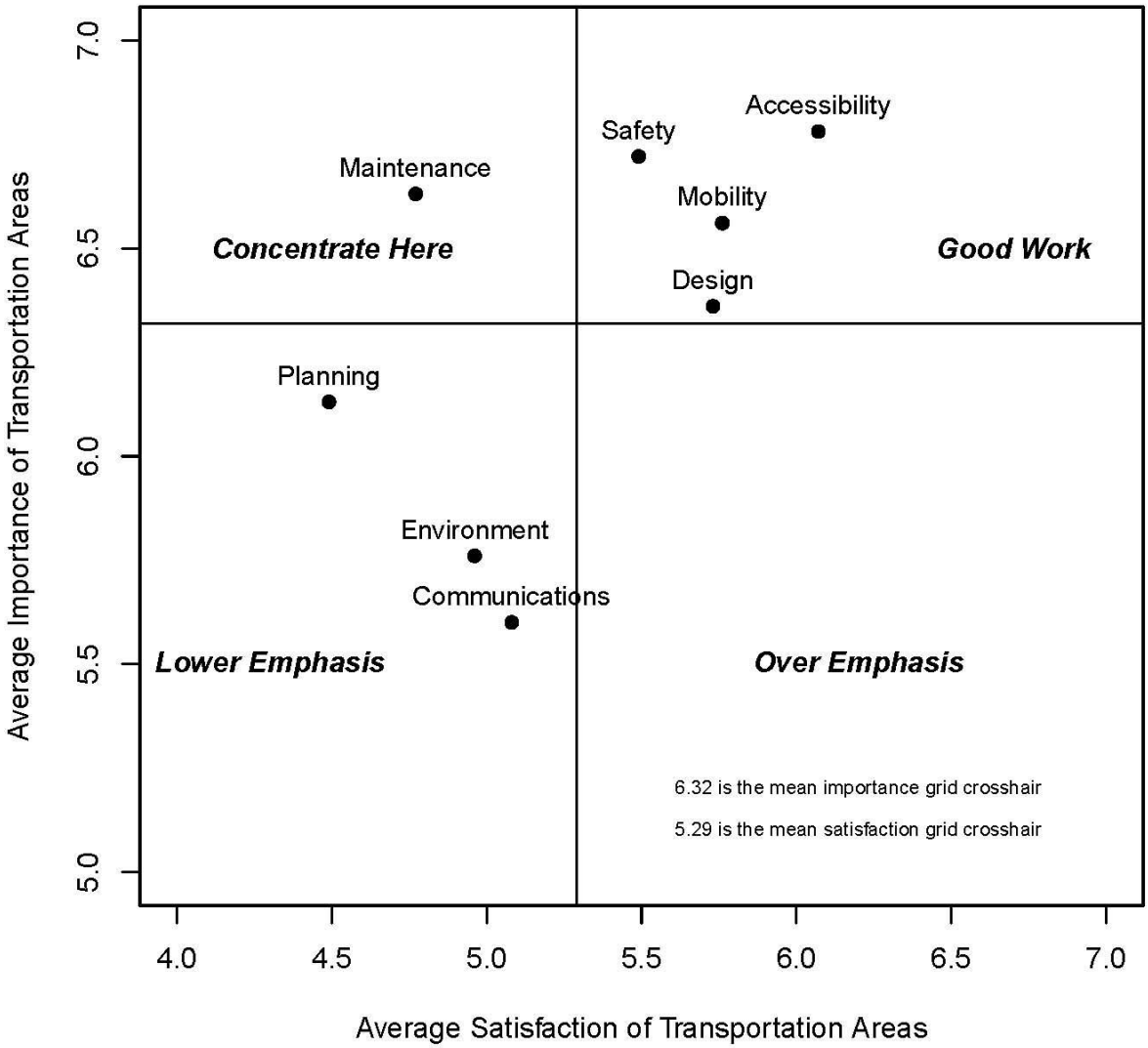


***Figure 4.13.*** **Importance and performance analysis for transportation areas in metro Minnesota, 2011.**

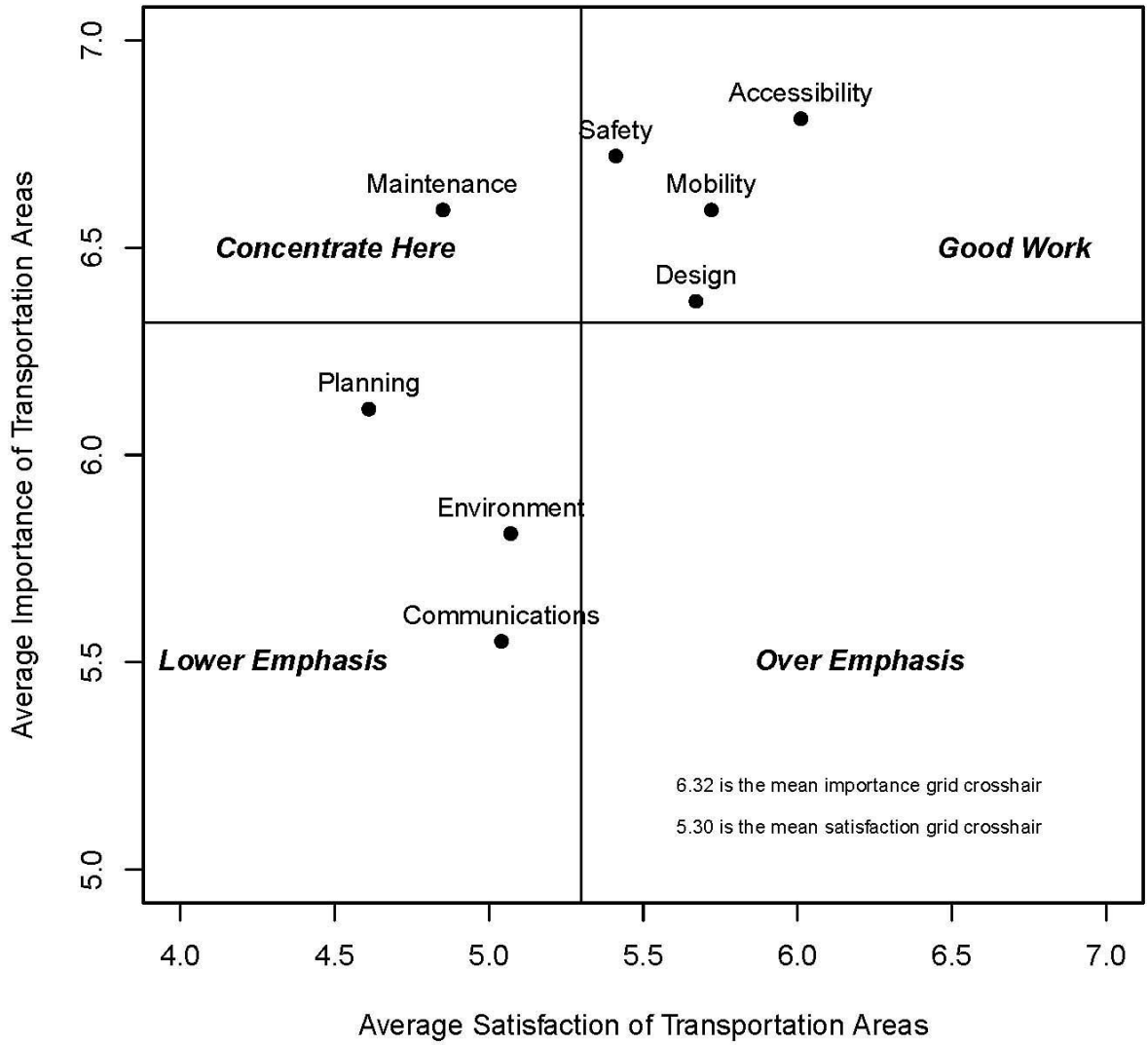


***Figure 4.14.*** **Importance and performance analysis for transportation areas in central Minnesota, 2011.**

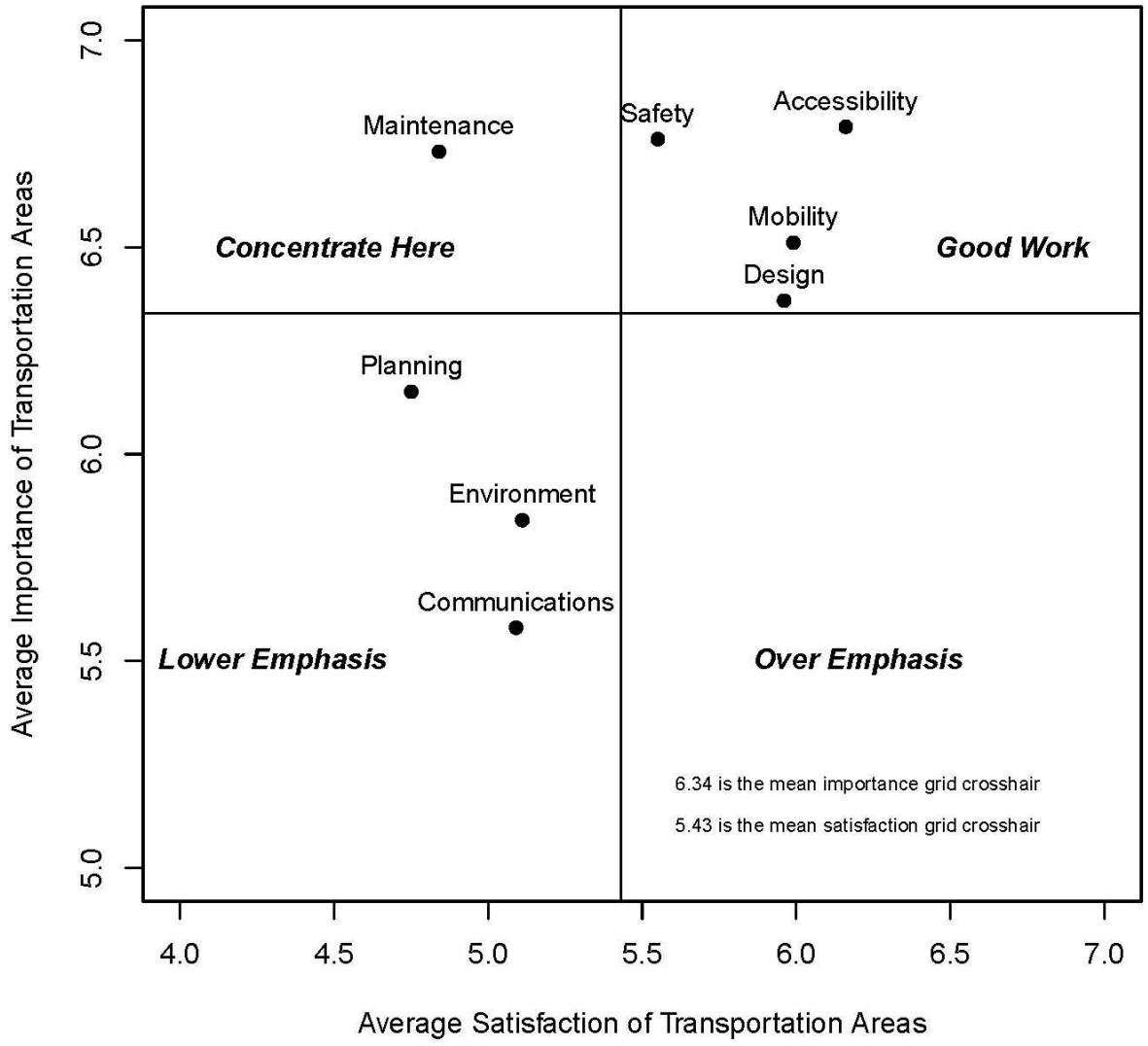


***Figure 4.15.*** **Importance and performance analysis for transportation areas in northeast Minnesota, 2011.**

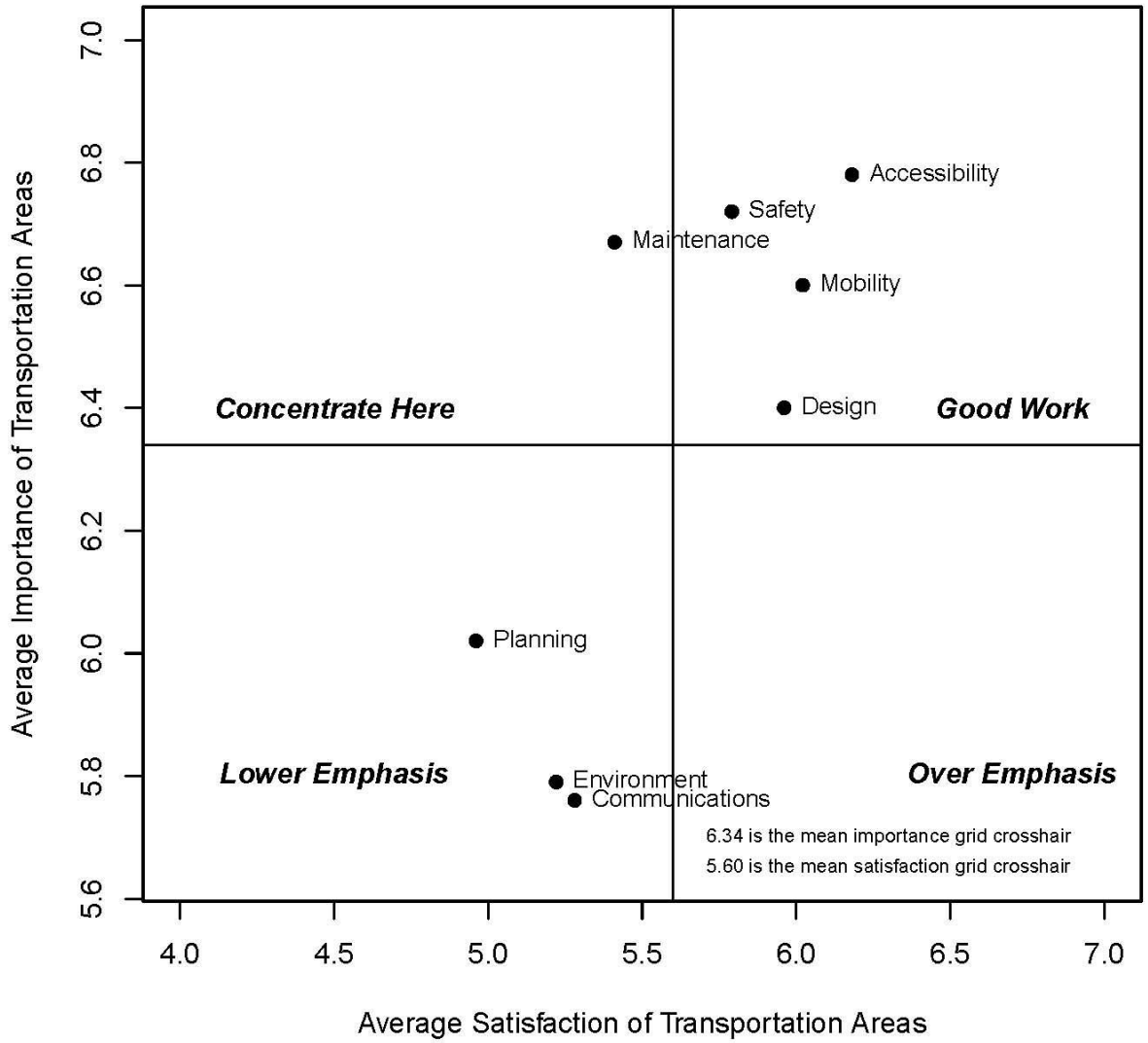


***Figure 4.16.*** **Importance and performance analysis for transportation areas in northwest Minnesota, 2011.**

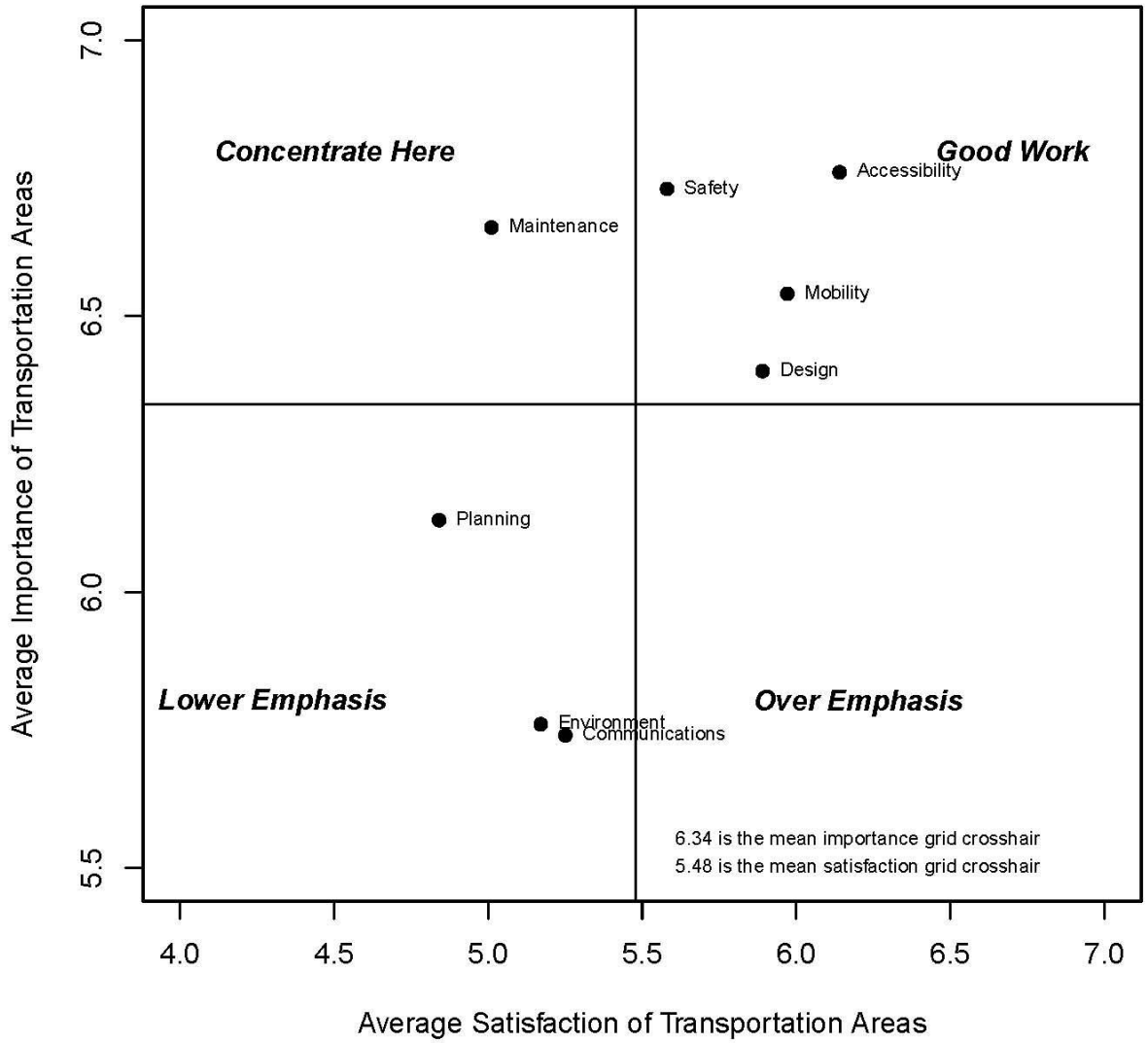


***Figure 4.17.*** **Importance and performance analysis for transportation areas in southern Minnesota, 2011.**

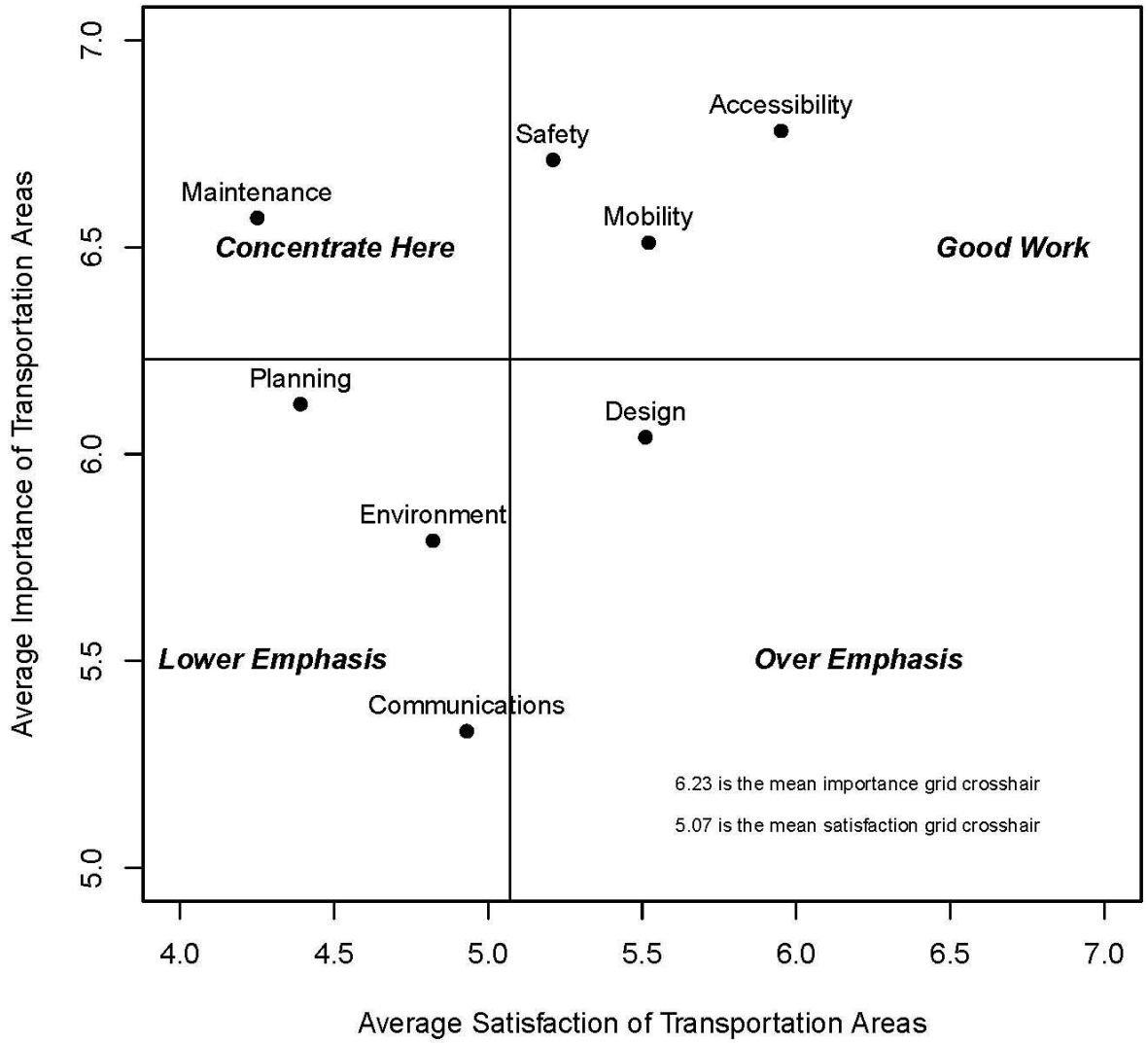


***Figure 4.18.*** **Importance and performance analysis for transportation areas for younger group in Minnesota, 2011.**

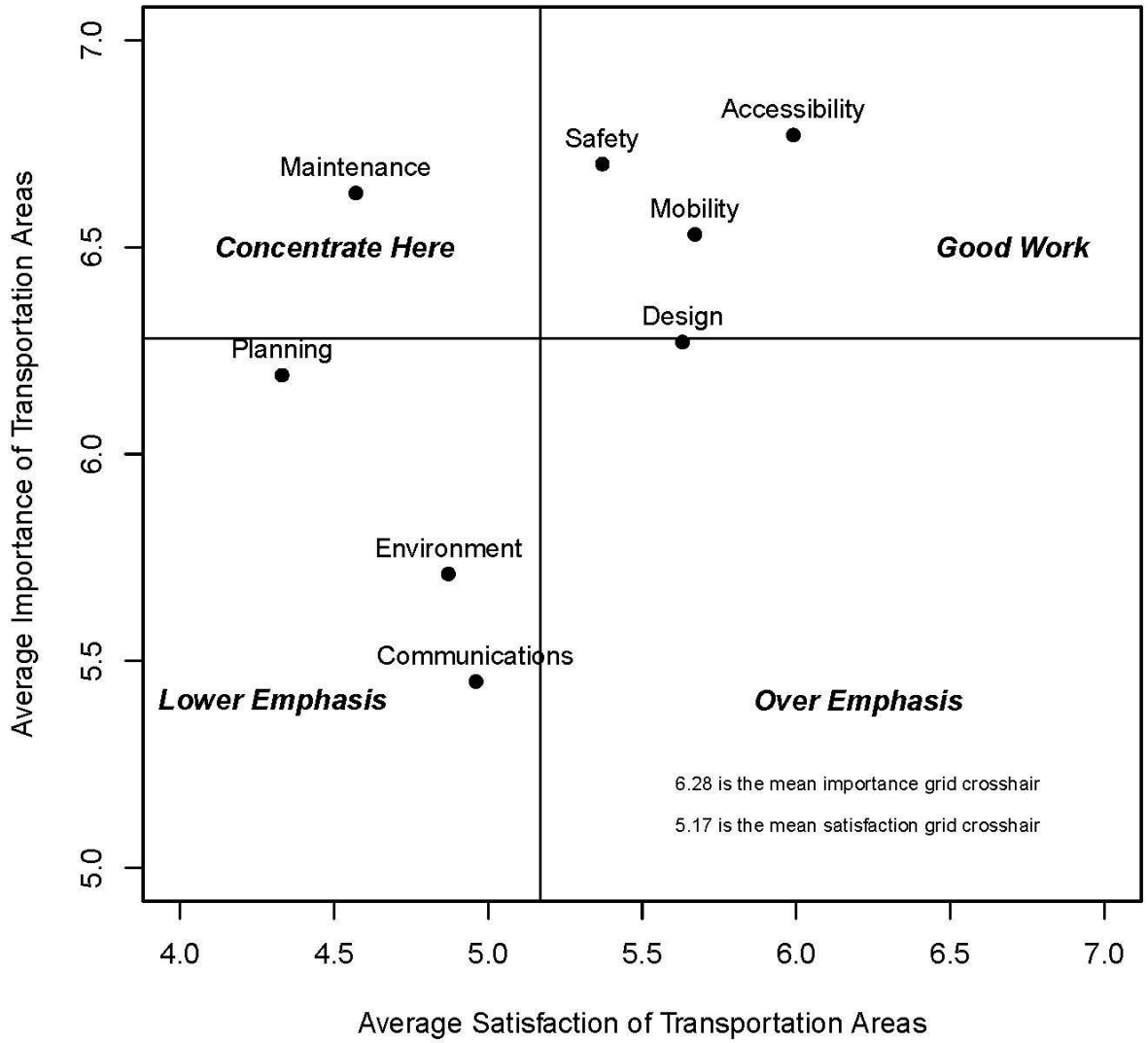


***Figure 4.19.*** **Importance and performance analysis for transportation areas for middle aged group in Minnesota, 2011.**

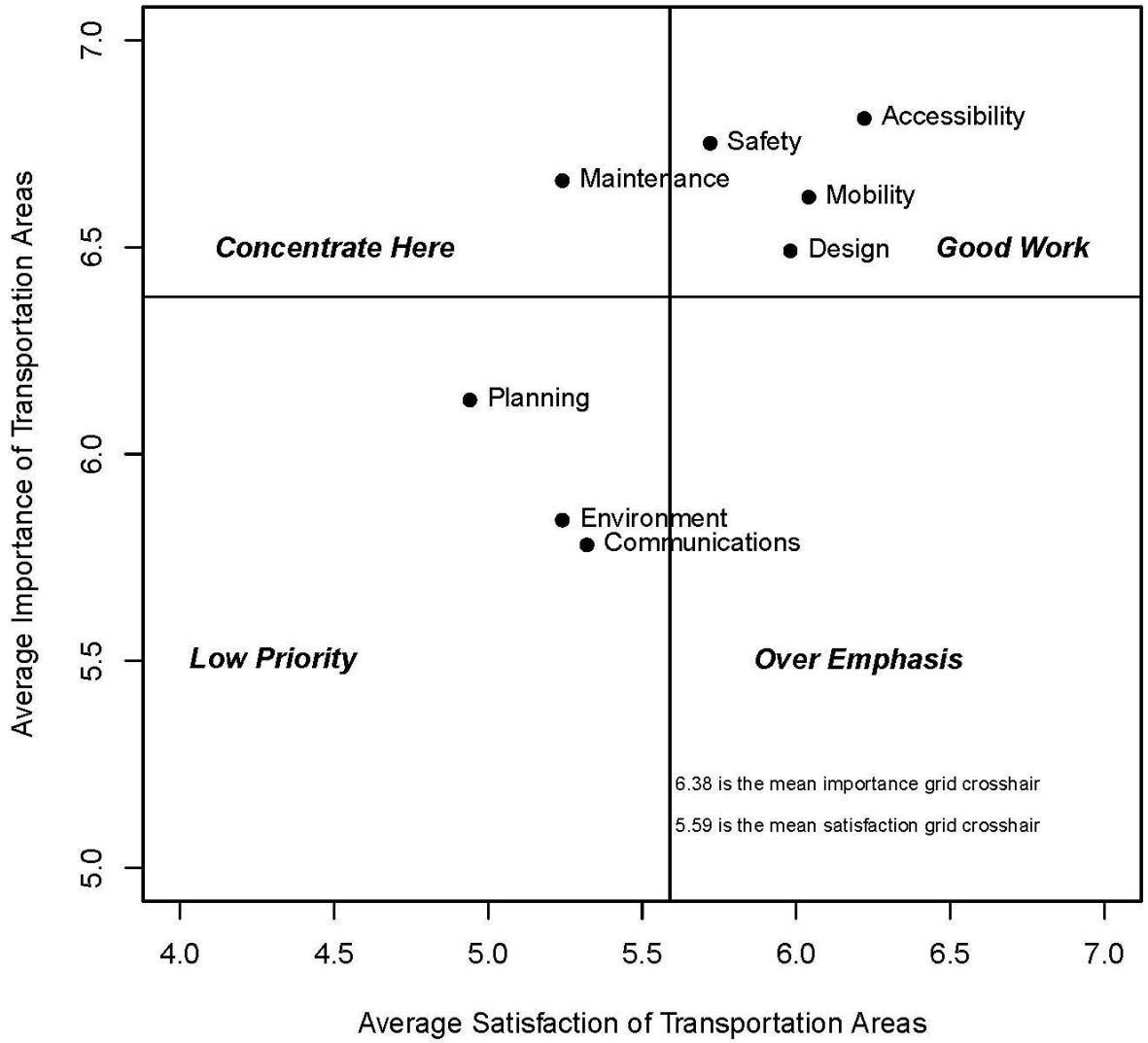


***Figure 4.20.*** **Importance and performance analysis for transportation areas among older aged group in Minnesota, 2011.**

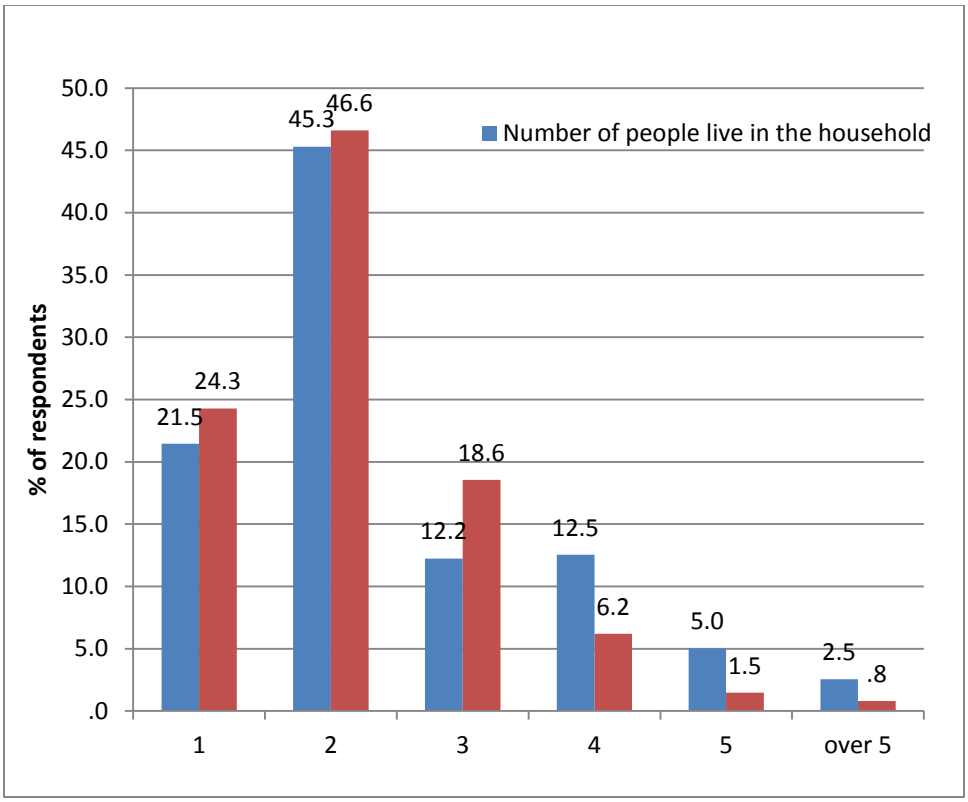


***Figure 4.21.*** **Number of people and autos per household in Minnesota, 2011.**

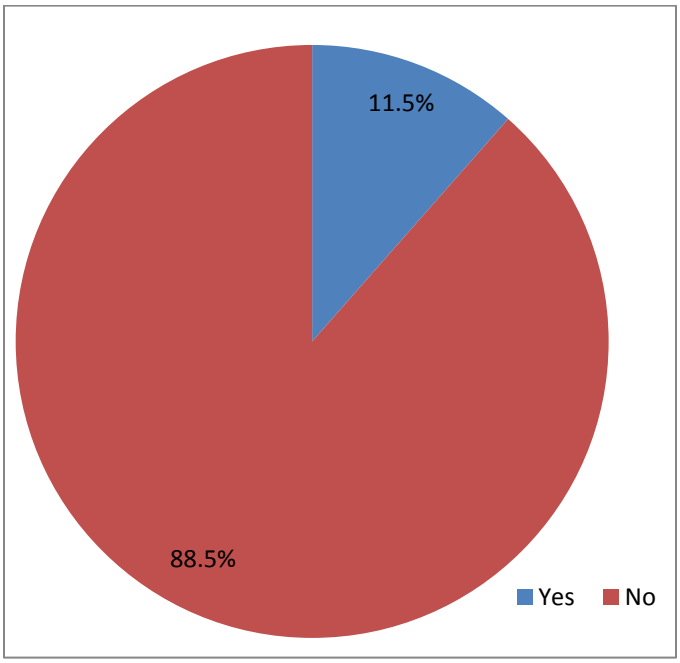


***Figure 4.22.*** **Percentage of people reporting a disability.**

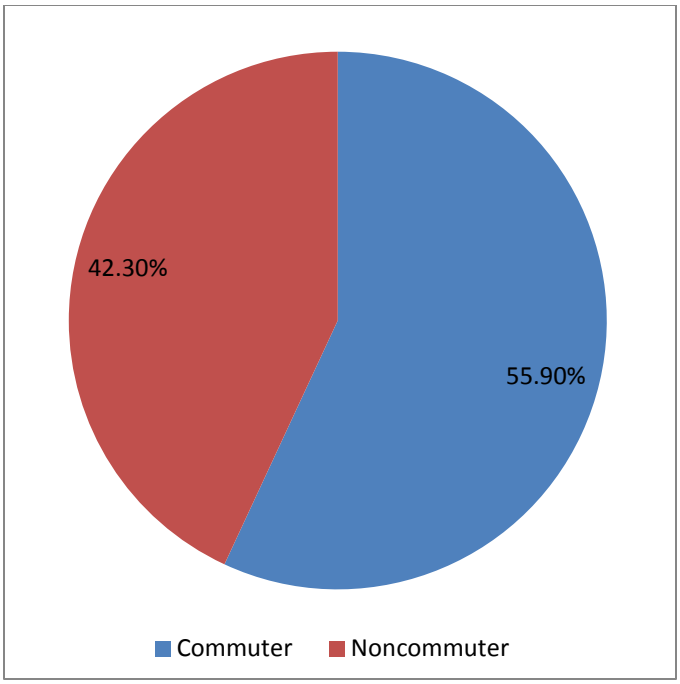


***Figure 4.23*. Percentage of respondents self-identified as commuters or non-commuters in Minnesota, 2011.**

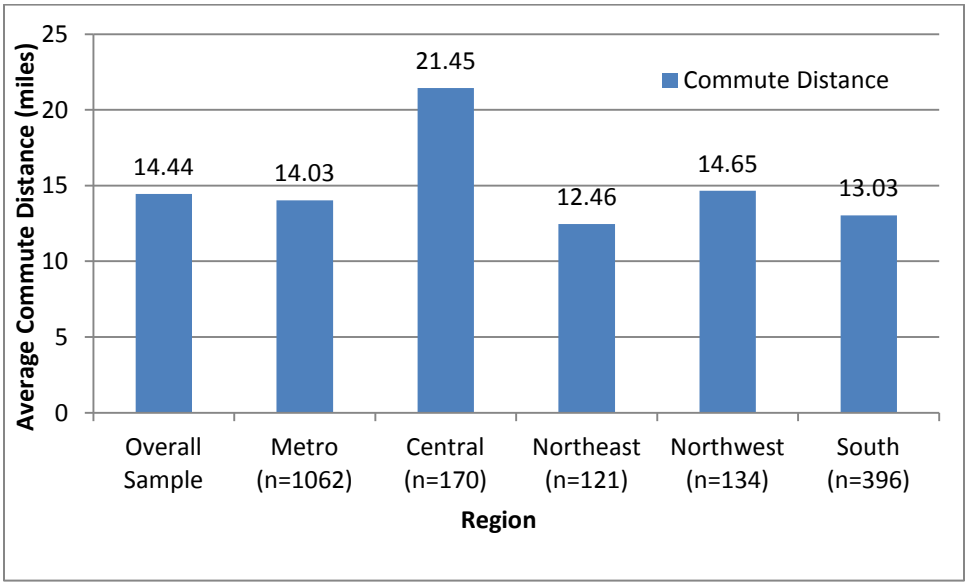


***Figure 4.24*. Average commute distance in miles by region in Minnesota, 2011.**

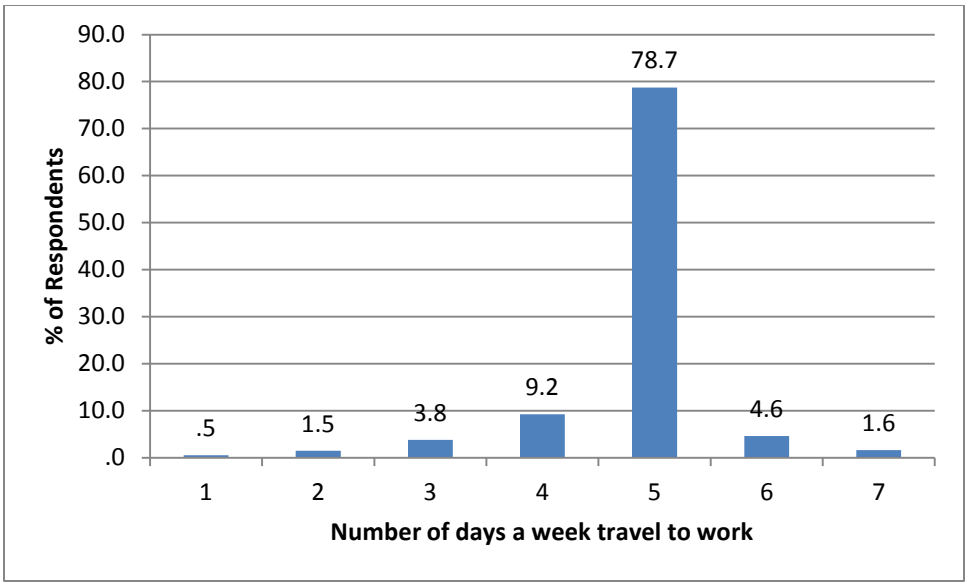


***Figure 4.25*. Distribution of number of days a week traveling to work in Minnesota, 2011.**

# Appendix D
# Supplemental Tables and Figures

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**Table D.1**

***Importance of various areas of quality of life by age group among Minnesotans, 2011***

| | Younger 18-34 (n=149) | | Middle 35-59 (n=1460) | | Older 60+ (n=1639) | | F statistic |
|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | |
| Quality of life | 6.14 | 1.15 | 6.05[a] | 1.31 | 6.23[a] | 1.26 | 7.27*** |
| Family, friends & neighbors | 6.78 | 0.52 | 6.70 | 0.70 | 6.71 | 0.75 | .76 |
| Health | 6.75 | 0.56 | 6.84 | 0.52 | 6.85 | 0.62 | 1.95 |
| Employment/ finances | 6.71[a] | 0.58 | 6.68[b] | 0.73 | 6.09[a b] | 1.38 | 112.11*** |
| Safety & security | 6.65 | 0.71 | 6.71 | 0.68 | 6.72 | 0.77 | 0.71 |
| Housing | 6.56 | 0.56 | 6.51 | 0.88 | 6.55 | 0.97 | 0.92 |
| Education | 6.49[a] | 0.87 | 6.35[b] | 1.11 | 6.08[ab] | 1.45 | 20.28*** |
| Environment | 6.41 | 0.86 | 6.44 | 0.93 | 6.40 | 1.09 | .61 |
| Recreation & entertainment | 6.14 | 0.81 | 6.02 | 1.04 | 6.10 | 1.09 | 2.26 |
| Local services & amenities | 5.97[a] | 0.91 | 6.04[b] | 0.98 | 6.33[ab] | 0.98 | 36.87*** |
| Transportation | 5.92[a] | 1.06 | 6.12[b] | 1.13 | 6.22[ab] | 1.24 | 6.07** |
| Spirituality, faith & serenity | 5.70[a] | 1.49 | 5.92[b] | 1.44 | 6.29[ab] | 1.25 | 33.8*** |

*Note*. Means with same superscripts are significantly different Importance of various areas to quality of life measured with 7 point scale: 1= Very unimportant; 2= Somewhat unimportant; 3= Slightly unimportant; 4=Neither; 5= Slightly important; 6= Somewhat important; 7= Very important.

* p< .05 ** p< .01, ***p<.001

**Table D.2**

***Importance of various domains of quality of life between commuters and non-commuters among Minnesotans, 2011***

| | Commuter (n=1460) | | Non-commuter (n=1639) | | t statistic |
|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | |
| Quality of life | 6.11 | 1.25 | 6.18 | 1.34 | -1.38 |
| Health | 6.84 | 0.54 | 6.84 | 0.62 | 0.30 |
| Family, friends & neighbors | 6.71 | 0.71 | 6.71 | 0.73 | 0.04 |
| Safety & security | 6.71 | 0.68 | 6.71 | 0.78 | -0.18 |
| Employment/ finances | 6.70 | 0.66 | 5.96 | 1.44 | 17.09*** |
| Housing | 6.53 | 0.85 | 6.53 | 1.00 | -0.10 |
| Environment | 6.43 | 0.94 | 6.39 | 1.09 | 1.08 |
| Education | 6.38 | 1.10 | 6.02 | 1.46 | 7.69*** |
| Transportation | 6.16 | 1.09 | 6.16 | 1.30 | -1.01 |
| Local services & amenities | 6.07 | 0.96 | 6.33 | 0.99 | -7.68*** |
| Recreation & entertainment | 6.04 | 1.01 | 6.09 | 1.12 | -1.26 |
| Spirituality, faith & serenity | 5.99 | 1.39 | 6.22 | 1.32 | 17.09*** |

*Note.* Importance of various areas to quality of life measured with 7 point scale: 1= Very unimportant; 2= Somewhat unimportant; 3= Slightly unimportant; 4=Neither; 5= Slightly important; 6= Somewhat important; 7= Very important.

* p< .05 ** p< .01, ***p<.001

**Table D.3**

***Satisfaction with transportation design among Minnesota residents by region, 2011***

| Transportation Design Items | State | | Metro | | Central | | Northeast | | Northwest | | South | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Highway sign placement | 5.92 | 1.22 | 5.87 | 1.25 | 5.86 | 1.22 | 5.91 | 1.25 | 6.06 | 1.17 | 6.03 | 1.11 |
| Use of flashing yellow lights | 5.42 | 1.37 | 5.26 | 1.37 | 5.40 | 1.41 | 5.57 | 1.37 | 5.77 | 1.30 | 5.66 | 1.29 |
| Rumble strips | 5.28 | 1.55 | 5.19 | 1.48 | 5.38 | 1.52 | 5.09 | 1.77 | 5.60 | 1.49 | 5.40 | 1.61 |
| Stoplight timing | 5.03 | 1.72 | 4.84 | 1.77 | 4.67 | 1.80 | 5.38 | 1.56 | 5.51 | 1.55 | 5.37 | 1.56 |
| Bridges | 4.80 | 1.65 | 4.64 | 1.65 | 4.97 | 1.51 | 5.00 | 1.67 | 4.90 | 1.76 | 4.99 | 1.59 |
| Speed of construction projects | 4.51 | 1.82 | 4.30 | 1.84 | 4.51 | 1.77 | 4.86 | 1.73 | 4.94 | 1.70 | 4.75 | 1.77 |
| Use of roundabout intersections | 4.50 | 1.92 | 4.54 | 1.95 | 4.47 | 1.87 | 4.50 | 1.81 | 4.57 | 1.73 | 4.42 | 1.95 |
| On road bike lanes | 4.14 | 1.76 | 4.13 | 1.74 | 4.01 | 1.77 | 4.22 | 1.70 | 4.27 | 1.79 | 4.15 | 1.81 |
| Cost of construction projects | 3.78 | 1.73 | 3.73 | 1.69 | 3.67 | 1.70 | 3.94 | 1.83 | 3.89 | 1.74 | 3.88 | 1.75 |
| Cronbach $\alpha = .83$ | | | | | | | | | | | | |

*Notes.* Satisfaction with transportation design measured with 7 point scale: 1= Very dissatisfied; 2= Somewhat dissatisfied; 3= Slightly dissatisfied; 4=Neither; 5= Slightly satisfied; 6= Somewhat satisfied; 7= Very satisfie

**Table D.4**

***Perceived transportation-related environmental impacts among Minnesota residents by region, 2011***

| Environmental Impact Items | State | | Metro | | Central | | Northeast | | Northwest | | South | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Light pollution from street lights | 3.78 | 1.63 | 3.77 | 1.68 | 3.72 | 1.51 | 3.72 | 1.61 | 3.76 | 1.51 | 3.83 | 1.62 |
| Noise pollution from trains | 3.51 | 1.71 | 3.73 | 1.75 | 3.23 | 1.66 | 3.35 | 1.57 | 3.24 | 1.57 | 3.19 | 1.63 |
| Noise pollution from traffic | 3.05 | 1.54 | 2.92 | 1.55 | 3.12 | 1.52 | 3.17 | 1.51 | 3.27 | 1.44 | 3.21 | 1.55 |
| Drainage problems /flooding | 2.98 | 1.66 | 3.13 | 1.69 | 3.08 | 1.59 | 3.06 | 1.70 | 2.66 | 1.57 | 2.67 | 1.55 |
| Air pollution related to transportation | 2.92 | 1.63 | 2.78 | 1.63 | 2.95 | 1.57 | 3.03 | 1.71 | 3.21 | 1.59 | 3.11 | 1.61 |
| Water pollution related to transportation design/maintenance | 2.75 | 1.68 | 2.74 | 1.68 | 2.69 | 1.65 | 2.71 | 1.75 | 2.84 | 1.65 | 2.79 | 1.64 |
| Cronbach $\alpha = .85$ | | | | | | | | | | | | |

*Notes* Perceived transportation-related environmental impact measured with question “Please indicate the extent of your agreement that the following transportation and environmental related issues impact you community ” with 7 point scale: 1= Very strongly agree; 2= Somewhat agree; 3= Slightly agree; 4=Neither; 5= Slightly disagree; 6= Somewhat disagree; 7= Very strongly disagree.

**Table D.5**

***Perceived transportation safety among Minnesota residents, 2011***

| Safety Items | State | | Metro | | Central | | Northeast | | Northwest | | South | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Excluding other drivers, how safe do you feel using the actual highways as a traveler?[1] | 6.23 | 1.02 | 6.23 | 1.04 | 6.25 | 0.92 | 6.16 | 1.03 | 6.32 | 0.99 | 6.23 | 1.01 |
| How safe are the railroad crossings in your community?[1] | 5.79 | 1.29 | 5.77 | 1.28 | 5.97 | 1.19 | 5.66 | 1.37 | 5.87 | 1.33 | 5.79 | 1.27 |
| How safe is your community for pedestrians?[1] | 5.50 | 1.49 | 5.42 | 1.53 | 5.41 | 1.51 | 5.43 | 1.49 | 5.64 | 1.51 | 5.71 | 1.35 |
| My neighborhood is safe enough for an 80-year-old senior to walk around the block[2] | 5.26 | 1.77 | 5.25 | 1.78 | 4.85 | 1.84 | 5.19 | 1.80 | 5.28 | 1.78 | 5.46 | 1.69 |
| How safe is your community for bicyclists?[1] | 5.11 | 1.59 | 5.02 | 1.60 | 5.02 | 1.62 | 5.05 | 1.57 | 5.27 | 1.60 | 5.33 | 1.52 |
| There is so much traffic along the street I live on that it makes it difficult or unpleasant to walk [2] | 5.03 | 1.89 | 5.12 | 1.88 | 4.73 | 1.87 | 4.87 | 2.05 | 4.86 | 1.84 | 5.09 | 1.89 |
| How safe do you feel on the road with other drivers?[1] | 4.99 | 1.60 | 4.85 | 1.64 | 4.99 | 1.55 | 5.13 | 1.51 | 5.28 | 1.52 | 5.19 | 1.52 |
| It is safe enough so that I would let a 10-year-old child walk | 4.73 | 1.93 | 4.68 | 1.97 | 4.41 | 1.86 | 4.67 | 1.91 | 4.82 | 1.88 | 5.01 | 1.87 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| around the block[2] | | | | | | | | | | | | |
| It is safe to ride a bike, considering traffic and speeds[2] | 4.71 | 1.78 | 4.69 | 1.77 | 4.39 | 1.84 | 4.49 | 1.88 | 4.89 | 1.71 | 4.90 | 1.73 |
| Buses drive too fast in my area & make it unsafe for bikers & pedestrians[2] | 4.67 | 1.59 | 4.67 | 1.61 | 4.77 | 1.48 | 4.68 | 1.61 | 4.66 | 1.50 | 4.66 | 1.61 |
| It is safe to ride a bike considering the design of the roadway (e.g. shoulder width, edge lines, rumble strips) [2] | 4.63 | 1.79 | 4.64 | 1.78 | 4.34 | 1.86 | 4.42 | 1.88 | 4.68 | 1.72 | 4.77 | 1.77 |
| There is so much traffic along nearby streets that it makes it difficult or unpleasant to bike[2] | 4.62 | 1.90 | 4.55 | 1.90 | 4.39 | 1.90 | 4.65 | 1.97 | 4.73 | 1.80 | 4.84 | 1.86 |
| Cronbach $\alpha = .84$ | | | | | | | | | | | | |

*Notes*. [1]Measured with question "Please share your thoughts about the safety of various transportation elements" with 7 point scale: 1= Very unsafe; 2= Somewhat unsafe; 3= Slightly unsafe; 4=Neither; 5= Slightly safe; 6= Somewhat safe; 7= Very strongly safe.

[2]Measured with question "Please indicate the extent of your agreement with the following statement about biking and walking safety in your neighborhood and community" with 7 point scale: 1= Very strongly disagree; 2= Somewhat disagree; 3= Slightly disagree; 4=Neither; 5= Slightly agree; 6= Somewhat agree; 7= Very strongly agree.

**Table D.6**

***Satisfaction with accessibility among Minnesota residents, 2011***

| Accessibility | State | | Metro | | Central | | Northeast | | Northwest | | South | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Availability of parking (general) | 5.67 | 1.47 | 5.69 | 1.49 | 5.69 | 1.28 | 5.51 | 1.53 | 5.80 | 1.28 | 5.64 | 1.52 |
| Access to trails | 5.44 | 1.51 | 5.57 | 1.48 | 5.18 | 1.50 | 5.46 | 1.44 | 5.18 | 1.69 | 5.35 | 1.49 |
| Access to regional airports | 5.39 | 1.56 | 5.65 | 1.42 | 4.59 | 1.71 | 5.25 | 1.69 | 5.24 | 1.61 | 5.18 | 1.60 |
| Access to air travel | 5.38 | 1.63 | 5.79 | 1.42 | 4.41 | 1.74 | 4.92 | 1.83 | 5.05 | 1.65 | 4.97 | 1.65 |
| Access to sidewalks | 5.21 | 1.61 | 5.15 | 1.67 | 5.08 | 1.51 | 4.96 | 1.66 | 5.33 | 1.56 | 5.48 | 1.45 |
| Traffic information while traveling to alert motorists of delays, crashes and detours | 5.07 | 1.51 | 5.23 | 1.50 | 4.77 | 1.50 | 4.90 | 1.53 | 4.82 | 1.59 | 4.95 | 1.47 |
| Access to taxis & other similar service transportation | 4.86 | 1.66 | 5.03 | 1.62 | 4.47 | 1.67 | 4.68 | 1.65 | 4.37 | 1.73 | 4.80 | 1.68 |
| Public transportation fees | 4.65 | 1.43 | 4.73 | 1.46 | 4.53 | 1.31 | 4.56 | 1.47 | 4.48 | 1.39 | 4.61 | 1.35 |
| Access to public transportation | 4.58 | 1.81 | 4.87 | 1.78 | 4.42 | 1.74 | 3.84 | 1.87 | 4.22 | 1.72 | 4.26 | 1.78 |
| Access to buses between cities | 4.30 | 1.73 | 4.53 | 1.73 | 4.05 | 1.68 | 3.78 | 1.75 | 4.09 | 1.71 | 4.06 | 1.65 |
| Access to rail transportation between cities | 3.92 | 1.81 | 4.09 | 1.82 | 4.10 | 1.83 | 3.13 | 1.71 | 3.86 | 1.73 | 3.64 | 1.73 |
| Cronbach $\alpha$ =.87 | | | | | | | | | | | | |

*Notes.* Satisfaction with accessibility measured with 7 point scale: 1= Very dissatisfied; 2= Somewhat dissatisfied; 3= Slightly dissatisfied; 4=Neither; 5= Slightly satisfied; 6= Somewhat satisfied; 7= Very satisfied.

**Table D.7**

***Satisfaction with mobility among Minnesota residents, 2011***

| Mobility Items | State | | Metro | | Central | | Northeast | | Northwest | | South | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Travel time within & around your community | 5.67 | 1.43 | 5.54 | 1.52 | 5.46 | 1.50 | 5.76 | 1.32 | 5.85 | 1.31 | 5.98 | 1.20 |
| Commute time to & from work | 5.43 | 1.64 | 5.28 | 1.71 | 5.07 | 1.77 | 5.74 | 1.39 | 5.67 | 1.43 | 5.76 | 1.45 |
| Travel time to/from the Twin Cities | 5.07 | 1.62 | 5.14 | 1.55 | 4.41 | 1.76 | 5.03 | 1.76 | 5.00 | 1.70 | 5.24 | 1.56 |
| Weekend highway traffic | 5.06 | 1.65 | 5.11 | 1.60 | 4.41 | 1.77 | 4.56 | 1.92 | 5.09 | 1.67 | 5.39 | 1.45 |
| Wait time at railroad crossings | 4.92 | 1.56 | 4.98 | 1.47 | 4.96 | 1.36 | 4.86 | 1.61 | 4.67 | 1.91 | 4.89 | 1.65 |
| Transportation options to/from the Twin Cities | 4.51 | 1.81 | 4.80 | 1.72 | 4.03 | 1.81 | 3.80 | 1.97 | 4.36 | 1.77 | 4.29 | 1.84 |
| Travel time through construction zones | 4.33 | 1.70 | 4.12 | 1.72 | 4.28 | 1.68 | 4.50 | 1.70 | 4.66 | 1.61 | 4.68 | 1.60 |
| Cronbach $\alpha$ = .83 | | | | | | | | | | | | |

*Notes.*Satisfaction with mobility measured with 7 point scale: 1= Very dissatisfied; 2= Somewhat dissatisfied; 3= Slightly dissatisfied; 4=Neither; 5= Slightly satisfied; 6= Somewhat satisfied; 7= Very satisfied.

**Table D.8**

***Perceived satisfaction with transportation-related maintenance among Minnesota residents, 2011***

| Maintenance Items | State | | Metro | | Central | | Northeast | | Northwest | | South | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Making highway signs clearly readable | 5.78 | 1.23 | 5.77 | 1.24 | 5.74 | 1.23 | 5.78 | 1.10 | 5.84 | 1.25 | 5.82 | 1.23 |
| Clearing roads of snow & ice | 5.49 | 1.73 | 5.53 | 1.73 | 5.41 | 1.65 | 5.36 | 1.83 | 5.47 | 1.74 | 5.51 | 1.70 |
| Making road/pavement markings clearly visible | 5.36 | 1.49 | 5.32 | 1.51 | 5.35 | 1.43 | 5.33 | 1.53 | 5.52 | 1.41 | 5.45 | 1.48 |
| Rest areas for road trips | 5.36 | 1.45 | 5.38 | 1.44 | 5.32 | 1.35 | 5.18 | 1.62 | 5.33 | 1.50 | 5.42 | 1.43 |
| The visual appeal of the roadsides | 5.04 | 1.50 | 4.95 | 1.53 | 5.00 | 1.43 | 5.00 | 1.58 | 5.19 | 1.48 | 5.25 | 1.44 |
| Clearing roads of debris | 5.03 | 1.60 | 5.16 | 1.53 | 4.90 | 1.59 | 4.78 | 1.73 | 5.00 | 1.71 | 4.89 | 1.66 |
| Removing roadside litter | 4.86 | 1.66 | 4.77 | 1.68 | 4.71 | 1.62 | 4.88 | 1.68 | 4.94 | 1.67 | 5.10 | 1.58 |
| Clearing sidewalks of snow & ice | 4.73 | 1.65 | 4.72 | 1.70 | 4.70 | 1.45 | 4.36 | 1.73 | 4.78 | 1.55 | 4.89 | 1.57 |
| Eliminating weeds on the roadsides | 4.67 | 1.57 | 4.55 | 1.59 | 4.78 | 1.45 | 4.57 | 1.52 | 4.81 | 1.60 | 4.93 | 1.53 |
| Keeping road surfaces smooth | 3.95 | 1.95 | 3.79 | 1.96 | 3.91 | 1.84 | 3.77 | 2.01 | 4.45 | 1.86 | 4.20 | 1.91 |
| Cronbach $\alpha = .87$ | | | | | | | | | | | | |

*Notes*. Satisfaction with transportation-related maintenance measured with 7 point scale: 1= Very dissatisfied; 2= Somewhat dissatisfied; 3= Slightly dissatisfied; 4=Neither; 5= Slightly satisfied; 6= Somewhat satisfied; 7= Very satisfied.

**Table D.9**

***Perception of Minnesota Department of Transportation among Minnesota residents, 2011***

| Transparency Items | State | | Metro | | Central | | Northeast | | Northwest | | South | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Does what is best for Minnesota | 5.4 | 1.32 | 5.39 | 1.32 | 5.40 | 1.37 | 5.39 | 1.24 | 5.51 | 1.25 | 5.44 | 1.28 |
| Provides helpful and relevant information to citizens | 5.17 | 1.42 | 5.16 | 1.40 | 5.10 | 1.44 | 5.09 | 1.39 | 5.20 | 1.51 | 5.26 | 1.40 |
| Considers customer concerns and needs when developing transportation plans | 4.99 | 1.54 | 4.98 | 1.55 | 4.90 | 1.59 | 4.94 | 1.52 | 5.16 | 1.49 | 5.03 | 1.48 |
| Acts in a financially responsible manner | 4.87 | 1.55 | 4.87 | 1.55 | 4.76 | 1.61 | 4.90 | 1.53 | 4.93 | 1.54 | 4.92 | 1.52 |
| Cronbach $\alpha = .90$ | | | | | | | | | | | | |

*Notes.* Measured with question "Please indicate the extent of your agreement that the following statements about the Minnesota Department of Transportation " with 7 point scale: 1= Very strongly agree; 2= Somewhat agree; 3= Slightly agree; 4=Neither; 5= Slightly disagree; 6= Somewhat disagree; 7= Very strongly disagree.

**Table D.10**

***Stepwise regression analysis explaining the variance in satisfaction with transportation design in Minnesota, in 2011***

| Transportation Design Aspect | Model | |
|---|---|---|
| | Beta | t-statistic |
| Highway sign placement | .267 | 12.27*** |
| Stoplight timing | .138 | 5.99*** |
| Speed of construction projects | .120 | 5.44*** |
| Rumble strips | .084 | 4.09*** |
| Bridges | .065 | 3.06** |
| Use of flashing yellow lights | .065 | 2.78** |

*Note.* Adjusted R square= .278 (R square = .280), F(2172)=150.73, p<.001. Only variable retained in final models

* p< .05 ** p< .01 ***p<.001

**Table D.11**

***Stepwise regression analysis explaining the variance in satisfaction with transportation related environmental issues in Minnesota, in 2011***

| Transportation Related Environmental issues Aspect | Model | |
|---|---|---|
| | Beta | t-statistic |
| Noise pollution from trains | -.115 | -5.31*** |
| Drainage problems/flooding | -.105 | -3.93*** |
| Water pollution | .088 | 3.38** |

*Note.* Adjusted R square= .021(R square = .022), F(2,496)=19.02, p<.001. Only variable retained in final models

* p< .05 ** p< .01 ***p<.001

**Table D.12**

***Stepwise regression analysis explaining the variance in satisfaction with transportation safety in Minnesota, in 2011***

| Transportation Safety Aspect | Model | |
|---|---|---|
| | Beta | t-statistic |
| Safety of using actual roadways excluding other drivers | .239 | 11.61 |
| Railroad crossing safety in community | .148 | 7.70 |
| Safety on road with other drivers | .145 | 7.07 |
| It is safe to ride a bike considering the roadway design | .073 | 3.50 |
| Safety for pedestrians in community | .066 | 3.15 |
| Safety for 10-year-old | .042 | 2.08 |

*Note.* Adjusted R square= .227 (R square =.228), F (2493)=122.99, p<.001. Only variable retained in final models; * p< .05 ** p< .01 ***p<.001

**Table D.13**

***Stepwise regression analysis explaining the variance in satisfaction with transportation maintenance in Minnesota, in 2011***

| Transportation Maintenance Aspects | Model | |
|---|---|---|
| | Beta | t-statistic |
| Keeping road surfaces smooth | .480 | 29.37*** |
| Making road/pavement markings clearly visible | .124 | 7.12*** |
| The visual appeal of the roadsides | .078 | 7.12*** |
| Clearing roads of debris | .074 | 3.85*** |
| Rest areas for road trips | .045 | 2.80** |

*Note.* Adjusted R square= .441 (R square =.410), F(2907)=405.07, p<.001. Only variable retained in final models; * p< .05 ** p< .01 ***p<.001

**Table D.14**

***Stepwise regression analysis explaining the variance in satisfaction with accessibility in Minnesota, in 2011***

| Accessibility Aspects | Model | |
|---|---|---|
| | Beta | t-statistic |
| Traffic information to alert motorists of delays, crashes and detours | .149 | 5.82 |
| Access to taxis and other similar service transportation options | .115 | 4.64 |
| Availability of parking in your community | .104 | 4.42 |
| Access to regional airports | .103 | 4.06 |
| Public transportation fees | .103 | 4.13 |
| Access to trails | .057 | 2.20 |

*Note.* Adjusted R square=.179 (R square =.182), F(1786)=66.25, p<.001. Only variable retained in final models

* p< .05 ** p< .01 ***p<.001

**Table D.15**

***Stepwise regression analysis explaining the variance in satisfaction with mobility in Minnesota, in 2011***

| Mobility Aspects | Model | |
|---|---|---|
| | Beta | t-statistic |
| Travel time within and around your community | .228 | 10.29*** |
| Travel time to/from the Twin Cities | .189 | 7.74*** |
| Travel time through construction zones | .168 | 7.35*** |
| Weekend highway traffic | .120 | 5.09*** |

| | | |
|---|---|---|
| Wait time at railroad crossings | .046 | 2.17* |

*Note.* Adjusted R square= .324(R square =.326), F(1987)=192.00, p<.001. Only variable retained in final models

* p< .05 ** p< .01 ***p<.001

**Table D.16**

***Stepwise regression analysis explaining the variance in satisfaction with MnDOT communications in Minnesota, in 2011***

| Communications Aspects | Model | |
|---|---|---|
| | Beta | t-statistic |
| Provides helpful and relevant information to citizens | .475 | 23.78*** |
| Does what is best for Minnesota | .107 | 4.82*** |
| Acts in a financially responsible manner | .053 | 2.43* |

*Note.* Adjusted R square= .342 (R square =.343), F(3014)=524.02, p<.001. Only variable retained in final models

* p< .05 ** p< .01 ***p<.001

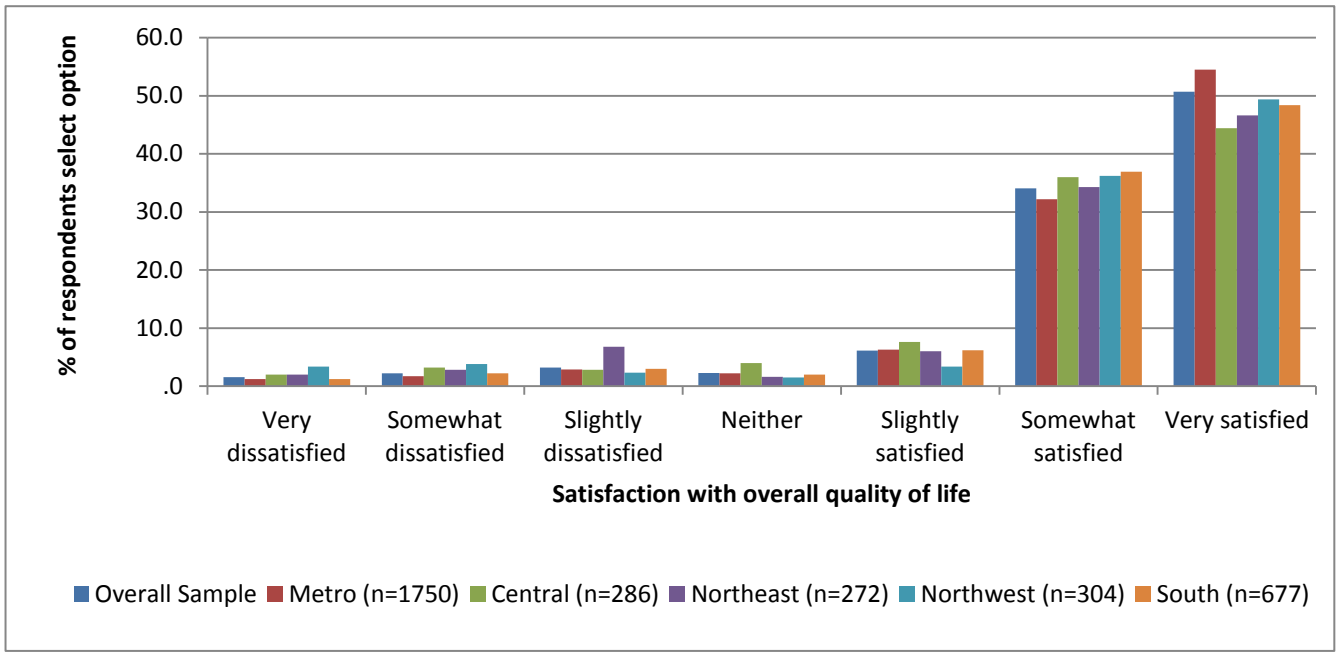



***Figure D.1.*** **Satisfaction with overall quality of life among residents in Minnesota, 2011.**

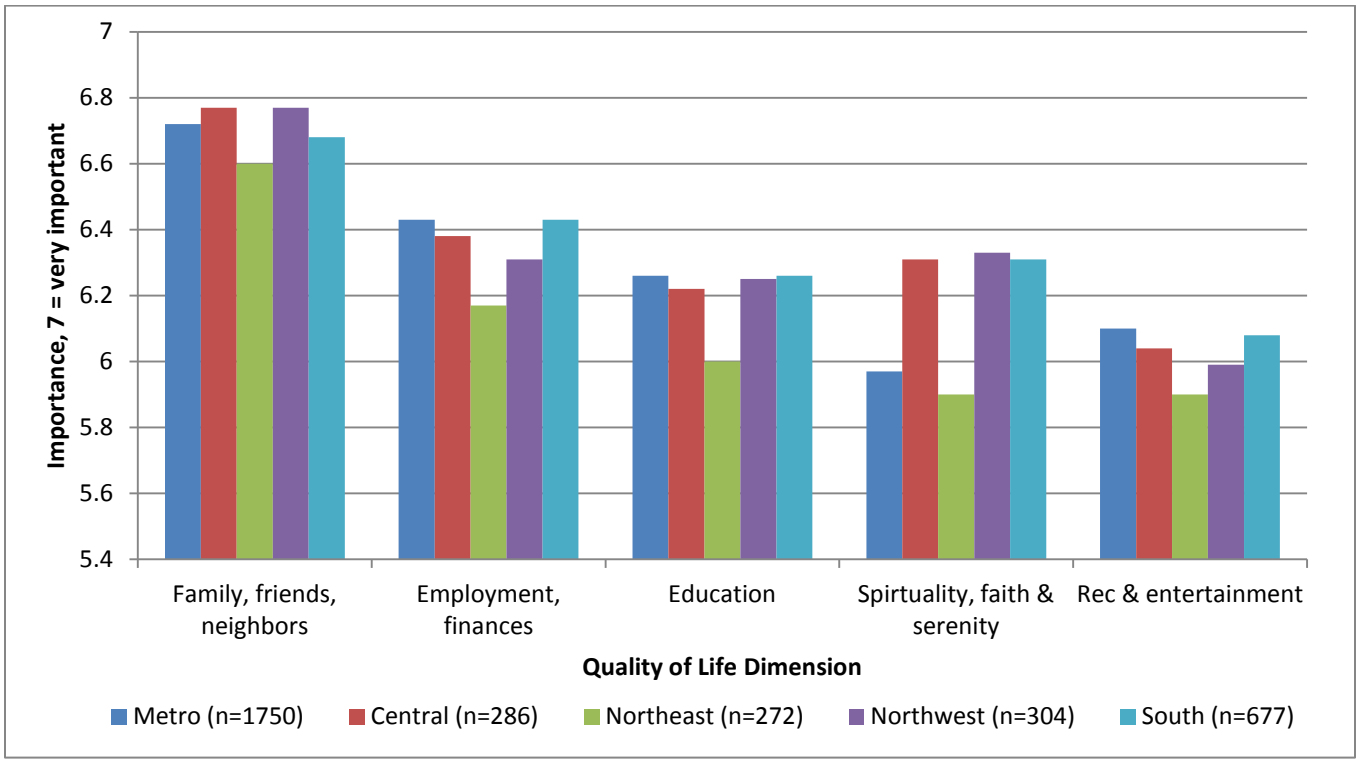



***Figure D2.*** **Significant differences on quality of life areas among Minnesota's regional residents, 2011.**

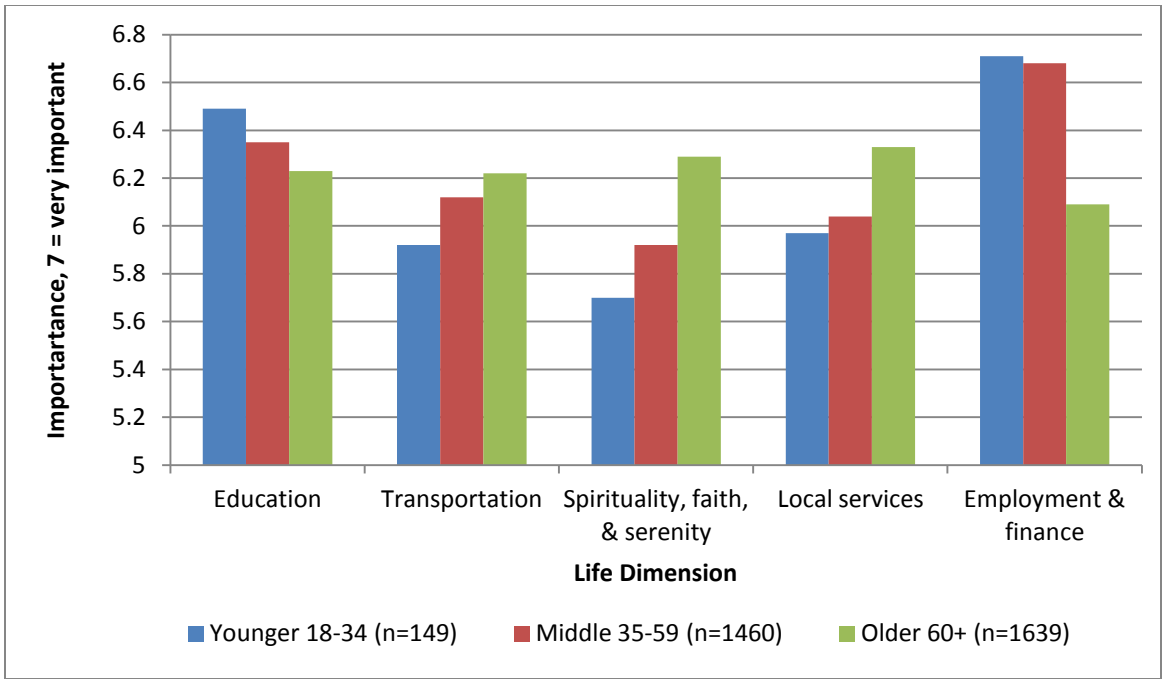



***Figure D.3.*** **Significant differences on importance of quality of life areas by age groups among Minnesotans, 2011.**

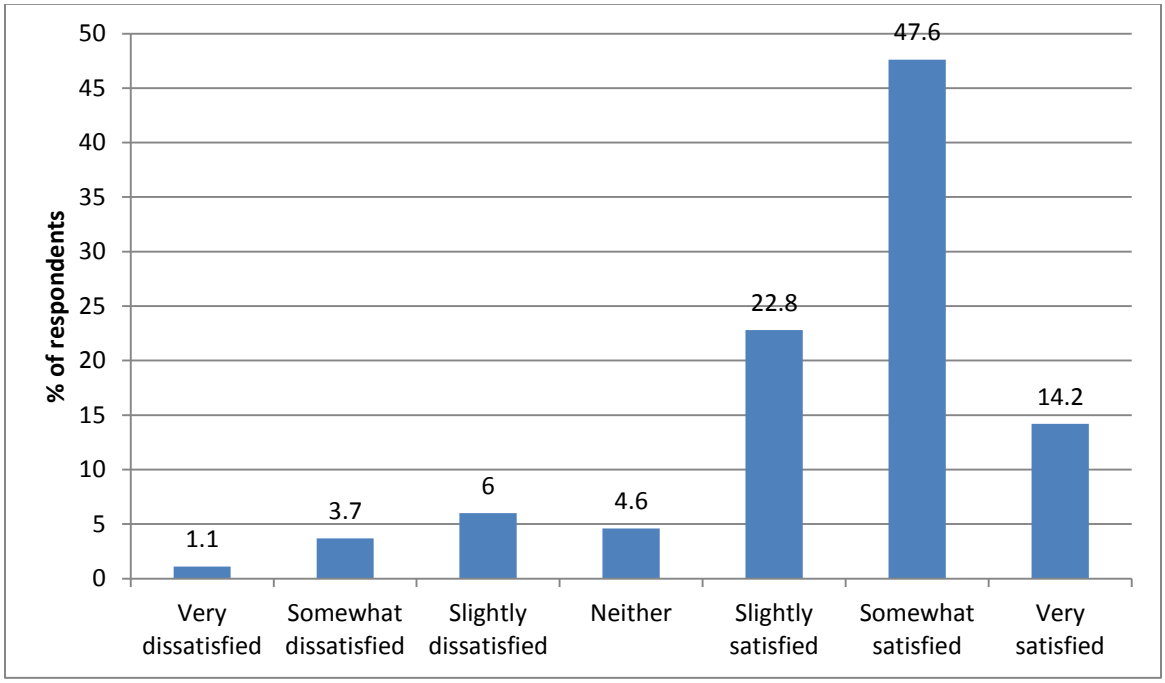



***Figure D.4.*** **Satisfaction with MnDOT services among non-employees in Minnesota, 2011 (n=3215).**

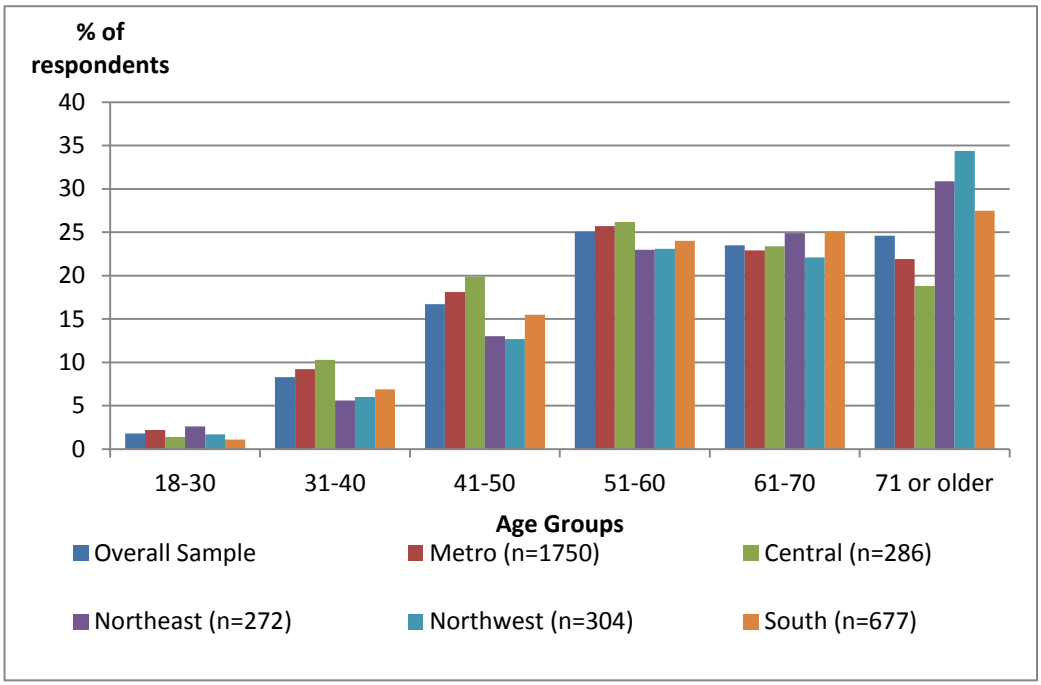



***Figure D.5.*** **Age distribution of the sample by regions**

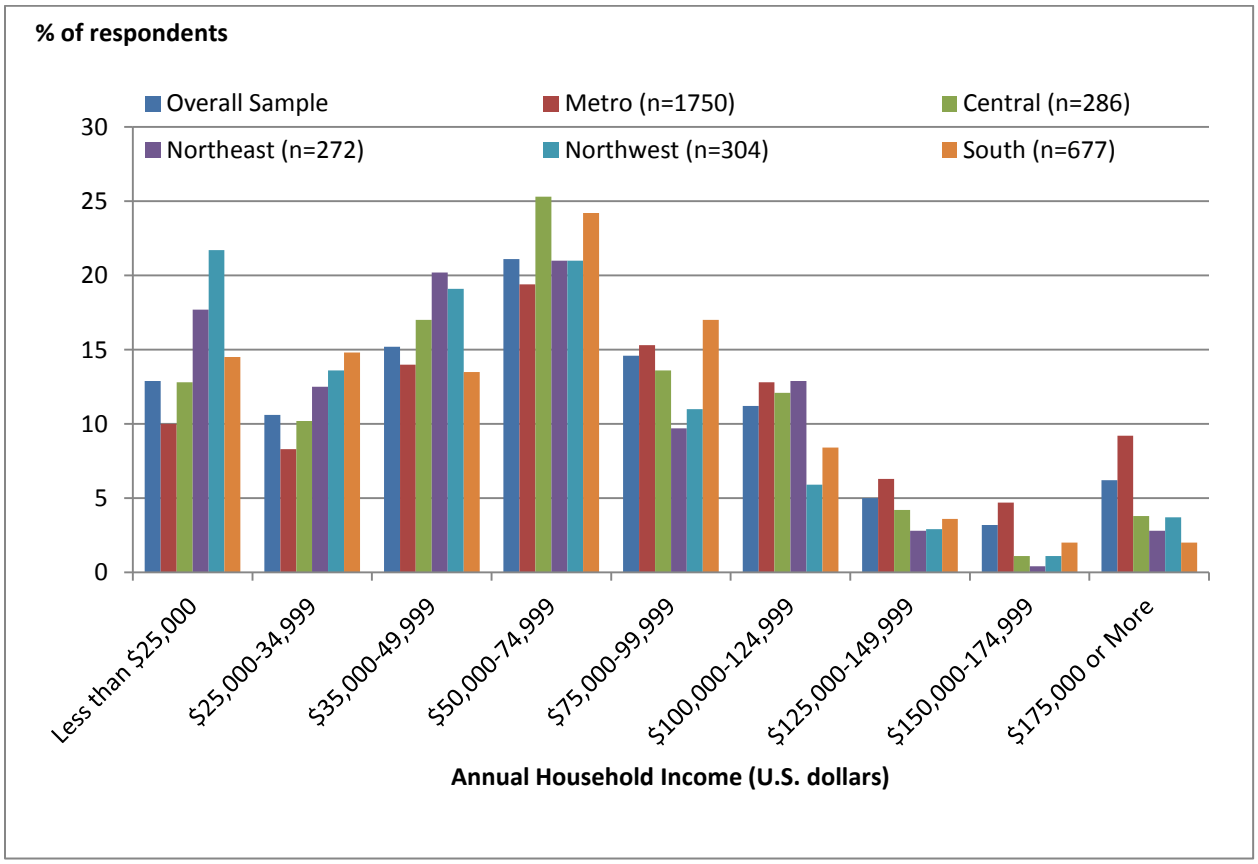
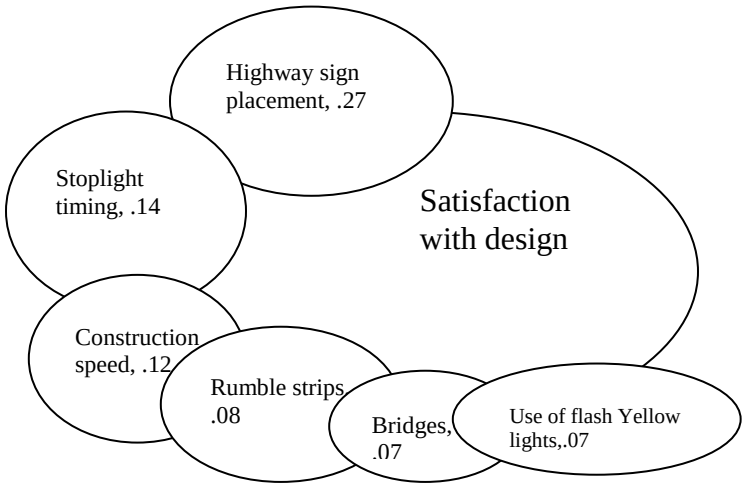
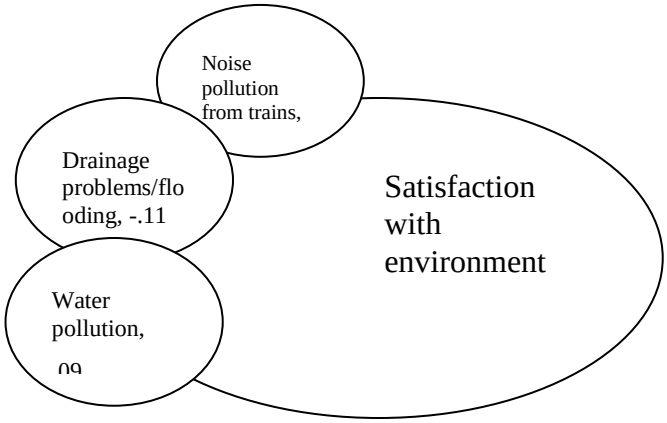



***Figure D.6.*** **Annual household income in sample by regions.**




*Not significant predictor: Use of roundabout intersections, Cost of construction project, On road bike lanes*

***Figure D.7.*** **Diagram illustrating relative contribution of various factors to explain satisfaction with transportation design among Minnesotans, 2011. Model Adjusted $R^2$=.278.**




*Not significant predictor: Noise pollution from traffic, air pollution, light pollution from street lights*

***Figure D.8.*** **Diagram illustrating relative contribution of various factors to explain satisfaction with transportation related environmental issues among Minnesotans, 2011. Model Adjusted $R^2$=.021.**

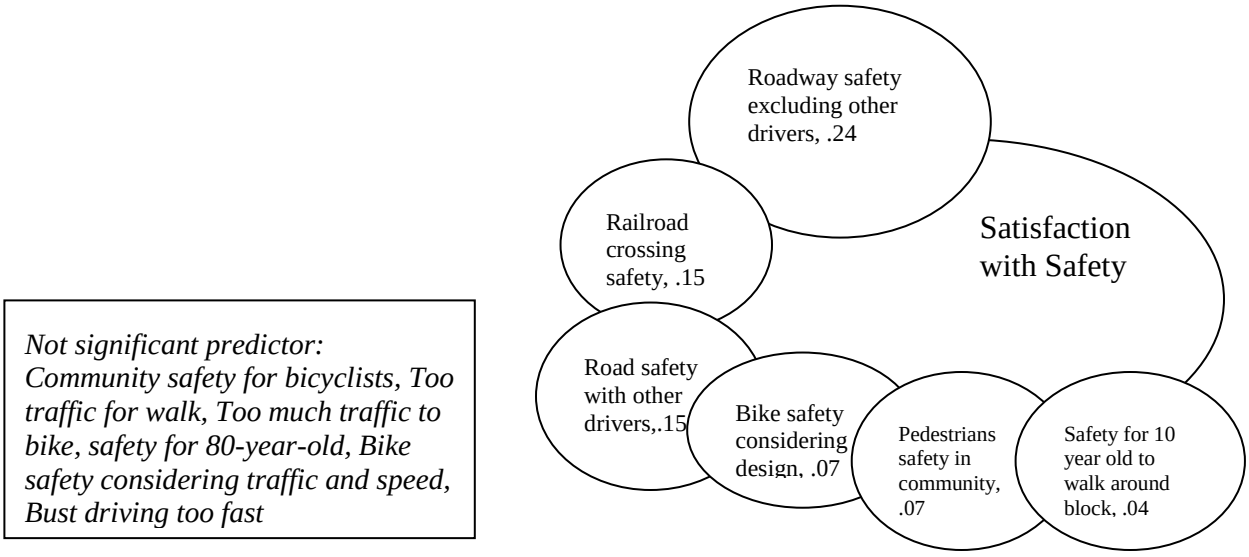



***Figure D.9.*** **Diagram illustrating relative contribution of various factors to explain satisfaction with transportation safety among Minnesotans, 2011. Model Adjusted $R^2$=.227.**

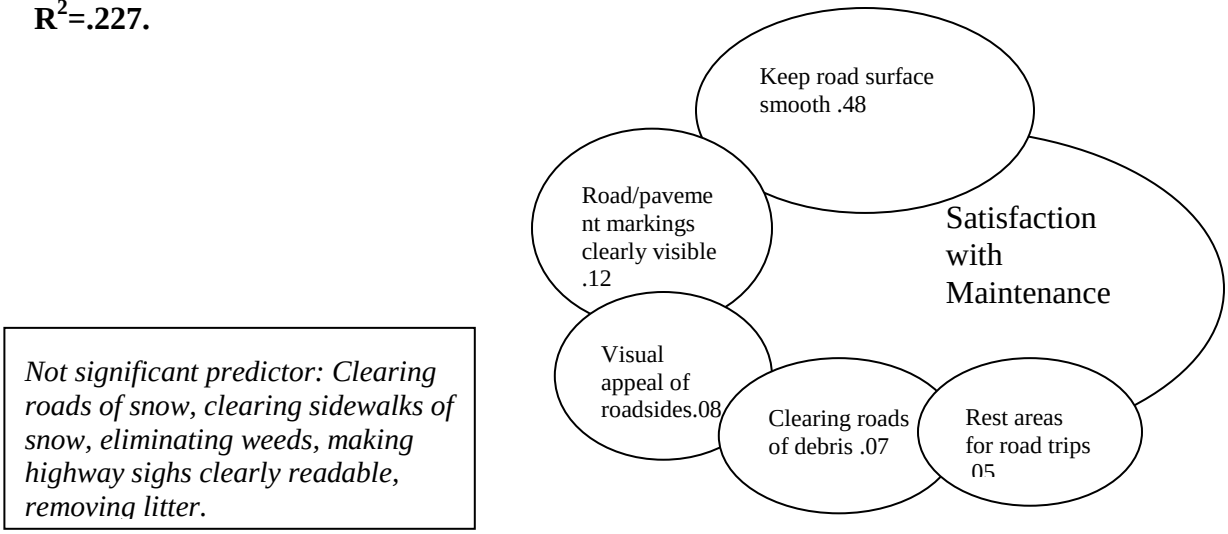



***Figure D. 10.*** **Diagram illustrating relative contribution of various factors to explain satisfaction with maintenance among Minnesotans, 2011. Model Adjusted $R^2$=.441.**

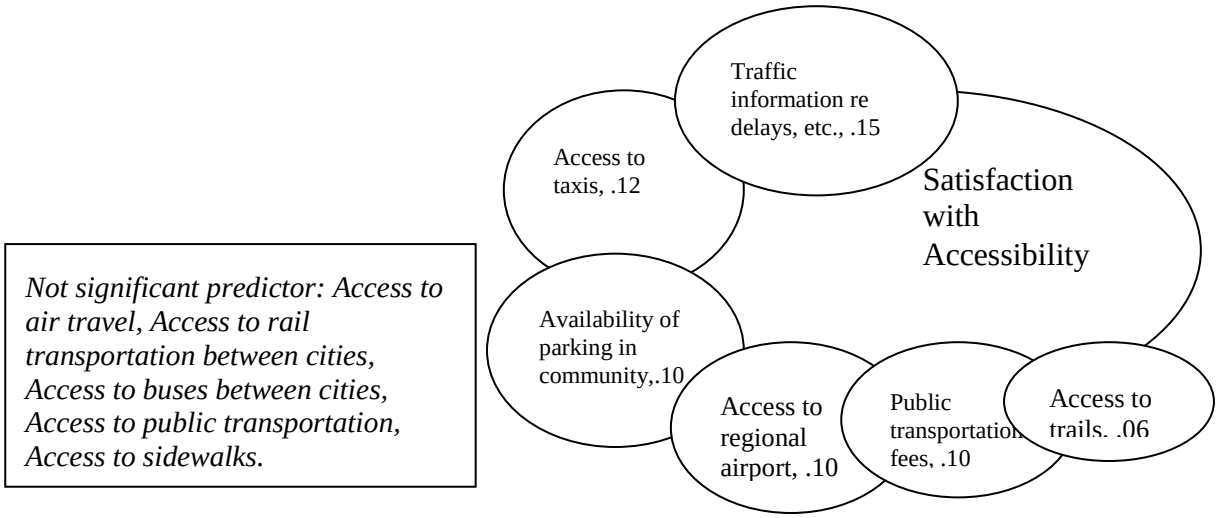



***Figure D. 11*. Diagram illustrating relative contribution of various factors to explain satisfaction with accessibility among Minnesotans, 2011. Model Adjusted $R^2$=.179.**

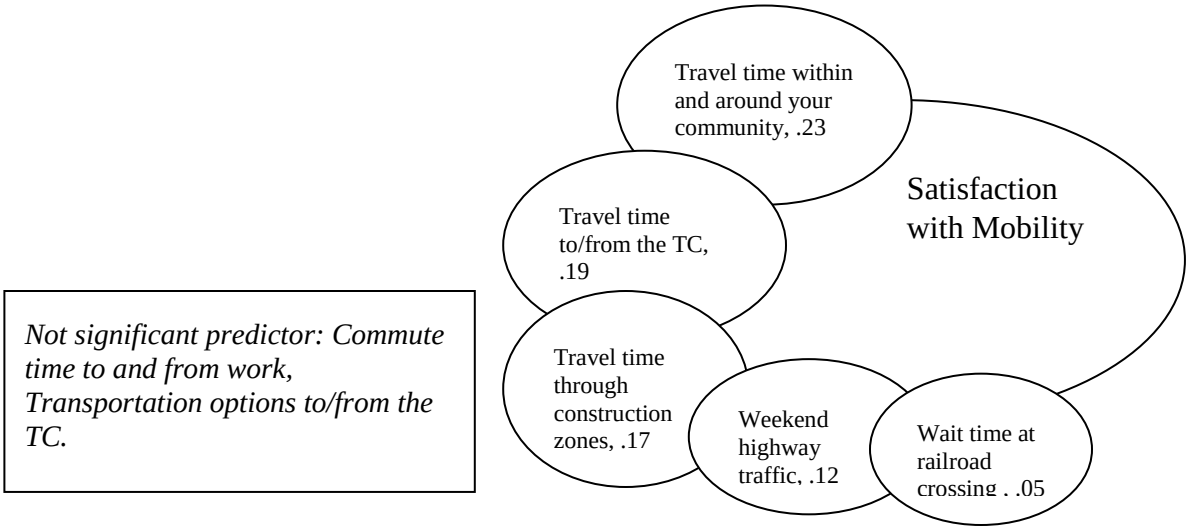



***Figure.D.12.* Diagram illustrating relative contribution of various factors to explain satisfaction with mobility among Minnesotans, 2011. Model Adjusted $R^2$=.324.**

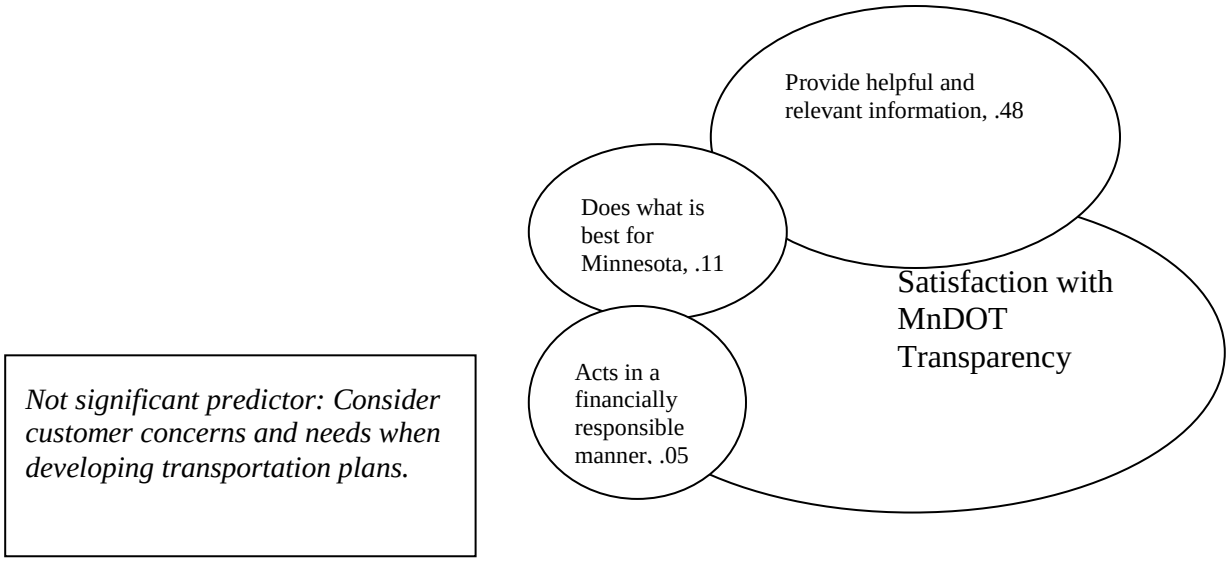



***Figure.D.13.*** **Diagram illustrating relative contribution of various factors to explain satisfaction with MnDOT transparency among Minnesotans, 2011. Model Adjusted $R^2$=.278.**

# Appendix E
# Questionnaire with Means, Standard Deviations and Frequencies

# *Transportation & Quality of life*

*First, a few questions about your experience in Minnesota and your travel patterns.*

**1. How many years have you lived in Minnesota (write in #)?**

*Mean = 49.1* Years (if less than 1, put 0), *SD = 20.2, n = 3296*

**2. How many years have you lived in this community?**

*Mean = 29.8* Years (if less than 1, put 0), *SD = 20.1, n = 3284*

**3. How many months of the year do you live in this community?**

*Mean = 11.7* Months of the year, *SD = 1.228, n = 3221*

*Please think about the community you live in – and your travels to and from this community – as you answer this survey.*

**4. Do you travel "To/From Work" Monday-Friday (check one)?**
*56.9%* Yes *43.1%* No **(If no, go to Question 5)**, *n = 3248*

**Approximately how many miles is your trip one way?**

*Mean = 14.44* Miles one way, *SD = 13.26, n = 1807*

**How many days a week do you travel to/from work Monday-Friday?**

*Mean = 4.84* Days to work, *SD = 0.75, n = 1838*

**Typically, are these trips during the hours of 6-9 am and 3-6:30pm?**

*88.2%* Yes *11.8%* No, *n = 1849*

**How satisfied are you with the predictability of your travel to/from work (check inside one box)?**

| Very Satisfied | Somewhat Satisfied | Slightly Satisfied | Neither | Slightly Dissatisfied | Somewhat Dissatisfied | Very Dissatisfied |
|---|---|---|---|---|---|---|
| *42.4%* | *33.5%* | *9.3%* | *5.2%* | *4.6%* | *3.1%* | *2.0%* |

*Mean = 5.87, SD = 1.45, n = 1794*

**5. How many times in the last 12 months within Minnesota have you…**

**taken public transportation (bus, train)?** *Mean = 7.4* Approx. # times in last 12 months, *SD = 44.8, n = 3209*

**biked outdoors?** *Mean = 11.9* Approx. # times in last 12 months, *SD = 42.8, n = 3161*

**6. Please identify the trips you take in a typical week. Check all the boxes that best represent the ways that you use to get to those places.** ***(Please check all the options that make up your typical trip. For example for To/From Work: drive alone to park-n-ride, take bus downtown, bike to office).***

| | **Ways to travel** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Trips** | Drive Alone | Car-pool | Bus (Public) | Metro Trains (Light Rail or Commuter Rail) | Bike | Walk | Taxi / Shuttle | Tele-commute (working from a remote location) |
| To/from work *n=2384* | *77.56% (1849)* | *5.87% (140)* | *3.65% (87)* | *0.88% (21)* | *3.94% (94)* | *3.48% (83)* | *0.34% (8)* | *4.28% (102)* |
| To/from school *n=260* | *60.77% (158)* | *18.08% (47)* | *6.92% (18)* | *0.38% (1)* | *3.85% (10)* | *7.31% (19)* | *0.38% (1)* | *2.31% (6)* |
| Shopping or run errands *n=3715* | *75.56% (2807)* | *12.17% (452)* | *1.40% (52)* | *0.35% (13)* | *3.74% (139)* | *6.46% (240)* | *0.32% (12)* | |
| Recreation, entertainment or meals *n=3907* | *57.23% (2236)* | *23.80% (930)* | *1.33% (52)* | *1.69% (66)* | *6.48% (253)* | *8.80% (344)* | *0.67% (26)* | |
| Other: *Specify:* Various *n=199* | *56.78% (113)* | *14.57% (29)* | *4.02% (8)* | *8.04% (16)* | *5.53% (11)* | *6.53% (13)* | *4.52% (9)* | |
| Medical *n=69* | *63.24% (43)* | *10.29% (7)* | *14.71% (10)* | *4.41% (3)* | - | *2.94% (2)* | *4.41% (3)* | - |
| Volunteer *n=27* | *92.59% (25)* | *3.70% (1)* | - | - | *3.70% (1)* | - | - | - |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Church<br>*n=90* | *68.89%*<br>*(62)* | *24.44%*<br>*(22)* | *1.11%*<br>*(1)* | | *1.11%*<br>*(1)* | *2.22%*<br>*(2)* | *2.22%*<br>*(2)* | - |

**7. How satisfied are you with transportation in your community (check inside one box)?**

| Very Satisfied | Somewhat Satisfied | Slightly Satisfied | Neither | Slightly Dissatisfied | Somewhat Dissatisfied | Very Dissatisfied |
|---|---|---|---|---|---|---|
| *27.4%* | *31.8%* | *9.7%* | *18.4%* | *5.6%* | *4.1%* | *3.1%* |

*Mean = 5.32, SD = 1.6, n = 3007*

**8. Please let us know about your current transportation situation by checking one box in each row below.**

| | Not at all | A little | Mod-erately | Mostly | Com-pletely |
|---|---|---|---|---|---|
| To what extent do you have adequate means of transportation?<br>*Mean = 4.52, SD =0 .98, n = 3189* | *3.9%* | *2.6%* | *4.3%* | *16.0%* | 73.3% |
| How much do difficulties with transportation options restrict your life?<br>*Mean = 4.58, SD =0 .85, n = 3169* | *74.2%* | *15.7%* | *6.1%* | *2.1%* | *1.9%* |
| To what extent do you have problems with transportation options?<br>*Please explain*: _____<br>*Mean = 4.59, SD =0.87, n = 2569* | *76.3%* | *13.2%* | *6.0%* | *2.4%* | *2.1* |

*Now, think about your quality of life. By "quality of life" we mean "the general wellbeing of residents taking into consideration such things as educational opportunities, employment opportunities, the economy, health, housing, recreation and entertainment opportunities, and so forth."*

**9. How satisfied are you with the quality of your life (check inside one box)?**

*Mean = 6.14, SD = 1.29, n = 2915*

| Very Satisfied | Somewhat Satisfied | Slightly Satisfied | Neither | Slightly Dissatisfied | Somewhat Dissatisfied | Very Dissatisfied |
|---|---|---|---|---|---|---|
| *50.7%* | *34.0%* | *6.1%* | *2.3%* | *3.2%* | *2.2%* | *1.5%* |

**10. The following factors relate to quality of life. Please indicate how important each is as a contributor to your quality of life. (check one box per row)**

| | Very Important | Somewhat Important | Slightly Important | Neither | Slightly Unimportant | Somewhat Unimportant | Very Unimportant |
|---|---|---|---|---|---|---|---|
| a. Education | | | | *Mean = 6.22, SD = 1.29, n = 3208* | | | |
| b. Transportation | | | | *Mean = 6.16, SD = 1.18, n = 3213* | | | |
| c. Environment | | | | *Mean = 6.41, SD = 1.01, n = 3219* | | | |
| d. Housing | | | | *Mean = 6.53, SD = 0.92, n = 3223* | | | |
| e. Family, friends & neighbors | | | | *Mean = 6.71, SD = 0.72, n = 3259* | | | |
| f. Health | | | | *Mean = 6.84, SD = 0.57, n = 3246* | | | |
| g. Safety & security | | | | *Mean = 6.71, SD = 0.73, n = 3251* | | | |
| h. Spirituality, faith & serenity | | | | *Mean = 6.10, SD = 1.36, n = 3243* | | | |
| i. Local services & amenities (library, shopping, community services, etc.) | | | | *Mean = 6.18, SD = 0.98, n = 3252* | | | |
| j. Recreation & entertainment (parks, music, restaurants, theatre) | | | | *Mean = 6.06, SD = 1.06, n = 3252* | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| k. Employment/ finances | | | | *Mean = 6.39, SD = 1.13, n = 3113* | | | |

**Now, looking at the above list, which 3 are the <u>most</u> important factors as contributors to your quality of life?**

**Findings reported here are most frequently identified letters in 1 thru 3**

*<u>f health (54.6%)</u>* *<u>e. family and friends (54.6%)</u>* *<u>k employment and finance (34.5%)</u>*

*Part of your life involves transportation. We are interested in learning more about your thoughts related to several areas of transportation. In this section, we ask about your perceptions of these areas and your satisfaction with them. The first section focuses on the physical layout of the transportation system and includes the roads, signs, and lights. Then, we move to the environment and safety areas.*

**11. How satisfied are you with the following parts of the roadway design? (check one box per row)**

| | Very Satisfied | Somewhat Satisfied | Slightly Satisfied | Neither | Slightly Dissatisfied | Somewhat Dissatisfied | Very Dissatisfied | Not Ap-plicable |
|---|---|---|---|---|---|---|---|---|
| a. Highway sign placement (including alternate route signs, speed limit) | | | | *Mean = 5.92, SD = 1.22, n = 3252* | | | | |
| b. Stoplight timing | | | | *Mean = 5.03, SD = 1.72, n = 3199* | | | | |
| c. Use of flashing yellow lights | | | | *Mean = 5.42, SD = 1.37, n = 3049* | | | | |
| d. Use of Roundabout intersections | | | | *Mean = 4.50, SD = 1.92, n = 2769* | | | | |
| e. Speed of construction projects | | | | *Mean = 4.51, SD = 1.82, n = 3224* | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| f. Cost of construction projects | | | | *Mean = 3.78, SD = 1.73, n = 3143* | | | | |
| g. Bridges | | | | *Mean = 4.80, SD = 1.65, n = 3083* | | | | |
| h. On road bike lanes | | | | *Mean = 4.14, SD = 1.76, n = 2924* | | | | |
| i. Rumble strips<br>loud road markers on road edge & at intersections) | | | | *Mean = 5.28, SD = 1.55, n = 3117* | | | | |

**Now, looking at the above list, which 2 are the <u>most</u> important parts of roadway design?**

*<u>a high way sign placement (50.03%)</u>* *<u>b stoplight timing(32.29%)</u>* **(write in 2 letters from the list above, a-i)**

**12. Please indicate the extent of your agreement that the following transportation and environmental related issues impact your community? (check one box per row)**

| | Very Strongly Agree | Some-what Agree | Slightly Agree | Neither | Slightly Disagree | Some-what Disagree | Very Strongly Disagree | N/A |
|---|---|---|---|---|---|---|---|---|
| a. Noise pollution from trains | | | | *Mean = 3.51, SD = 1.71, n = 2736* | | | | |
| b. Noise pollution from traffic | | | | *Mean = 3.05, SD = 1.54, n = 3223* | | | | |
| c. Air pollution | | | | *Mean = 2.92, SD = 1.63, n = 3220* | | | | |
| d. Light pollution from street lights | | | | *Mean = 3.78, SD = 1.63, n = 3196* | | | | |
| e. Water pollution | | | | *Mean = 2.75, SD =* | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | *1.68, n = 3214* | | | | |
| f. Drainage problems /flooding | | | | *Mean = 2.98, SD = 1.66, n = 3219* | | | | |

**Now, looking at the above list, which 2 are the <u>most</u> important environmental impacts?**

*_e water pollution53.6%_c air pollution 49.85%___* **(write in 2 letters from the list above)**

**13. Please share your thoughts about the safety of various transportation elements by checking one box in each row below.**

| | Very Safe | So me-wha t Safe | Slig htly Safe | Neither | Slig htly Uns afe | Some -what Unsa fe | Ve ry Un saf e | N/A |
|---|---|---|---|---|---|---|---|---|
| a. How safe do you feel on the road with other drivers? | | | | *Mean = 4.99, SD = 1.60, n = 3290* | | | | |
| b. Excluding other drivers, how safe do you feel using the actual roadways? | | | | *Mean = 6.23, SD = 1.02, n = 3289* | | | | |
| c. How safe is your community for pedestrians? | | | | *Mean = 5.50, SD = 1.49, n = 3286* | | | | |
| d. How safe is your community for bicyclists? | | | | *Mean = 5.11, SD = 1.59, n = 3276* | | | | |
| e. How safe are the railroad crossings in your community? | | | | *Mean = 5.79, SD = 1.29, n = 2847* | | | | |

**Now, looking at the above list, which 2 are the <u>most</u> important safety elements of transportation?**

**_a** safety on road with other drivers *63.88%*___ *_b safty on road excluding other drivers*_(44.59%)___
**(write in 2 letters from the list above, a-e)**

*This section focuses on your ability to get places you need and want to go and how easy it is to get there.*

**14. How satisfied are you with the following parts of the transportation system?**

| | Very Satisfied | Somewhat Satisfied | Slightly Satisfied | Neither | Slightly Dissatisfied | Somewhat Dissatisfied | Very Dissatisfied | N/A |
|---|---|---|---|---|---|---|---|---|
| a. Access to taxis & other similar service transportation options | | | | *Mean = 4.86, SD = 1.66, n = 2632* | | | | |
| b. Access to air travel | | | | *Mean = 5.38, SD = 1.6, n = 3078* | | | | |
| c. Access to regional airports | | | | *Mean = 5.39, SD = 1.56, n = 2978* | | | | |
| d. Access to rail transportation between cities | | | | *Mean = 3.92, SD = 1.81, n = 2673* | | | | |
| e. Access to buses between cities | | | | *Mean = 4.30, SD = 1.73, n = 2738* | | | | |
| f. Availability of parking in your community | | | | *Mean = 5.67, SD = 1.47, n = 3207* | | | | |
| g. Access to public transportation (buses, trains) | | | | *Mean = 4.58, SD = 1.81, n = 2896* | | | | |
| h. Travel time within & around your community | | | | *Mean = 5.67, SD = 1.43, n = 3245* | | | | |
| i. Commute time to & from work | | | | *Mean = 5.43, SD = 1.64, n = 2427* | | | | |
| j. Weekend highway traffic | | | | *Mean = 5.06, SD = 1.65, n = 3192* | | | | |
| k. Travel time to/from the Twin Cities | | | | *Mean = 5.07, SD = 1.62, n = 3124* | | | | |
| l. Transportation options to/from the | | | | *Mean = 4.51, SD = 1.81, n = 3016* | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Twin Cities | | | | | | | | |
| m. Travel time through construction zones | | | | *Mean = 4.33, SD = 1.70, n = 3216* | | | | |
| n. Wait time at railroad crossings | | | | *Mean = 4.92, SD = 1.56, n = 2880* | | | | |
| o. Public transportation fees (buses, trains) | | | | *Mean = 4.65, SD = 1.43, n = 2505* | | | | |
| p. Access to sidewalks | | | | *Mean = 5.21, SD = 1.61, n = 3060* | | | | |
| q. Access to trails | | | | *Mean = 5.44, SD = 1.51, n = 2967* | | | | |
| r. Traffic information while traveling to alert motorists of delays, crashes and detours | | | | *Mean = 5.07, SD = 1.51, n = 3073* | | | | |

**Now, looking at the above list, which 3 are the <u>most</u> important parts of the transportation system?** *_h.travel time within and around your community 36.15%____*

*__i commute time to and from work 31.02%%___*

*r, traffic information 19.86%_____* **(write in 3 letters from the list above, a-r)**

**15. Please indicate the extent of your agreement with the following statements about biking and walking safety in your neighborhood and community (check one box per row).**

| | Very Strongly Agree | Somewhat Agree | Slightly Agree | Neither | Slightly Disagree | Somewhat Disagree | Very Strongly Disagree |
|---|---|---|---|---|---|---|---|
| a. There is so much traffic along the street I live on that it makes it difficult or unpleasant to walk in my neighborhood | | | | *Mean = 5.03, SD = 1.89, n = 3241* | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| b. There is so much traffic along nearby streets in my neighborhood that it makes it difficult or unpleasant to bike | | | | *Mean = 4.62, SD = 1.90, n = 3216* | | | |
| c. The community is safe enough so that I would let a 10-year-old child walk around my block | | | | *Mean = 4.73, SD = 1.93, n = 3192* | | | |
| d. My neighborhood is safe enough for an 80-year-old senior to walk around the block | | | | *Mean = 5.26, SD = 1.77, n = 3234* | | | |
| e. It is safe to ride a bike considering the roadway design roadway (e.g. shoulder width, edge lines, rumble strips) | | | | *Mean = 4.63, SD = 1.79, n = 3223* | | | |
| f. It is safe to ride a bike, considering traffic and speeds | | | | *Mean = 4.71, SD = 1.78, n = 3220* | | | |
| g. Buses drive too fast in my area & make it unsafe for bikers & pedestrians | | | | *Mean = 4.67, SD = 1.59, n = 3149* | | | |
| **Now, looking at the above list, which 2 are the <u>most</u> important statements about biking and walking safety?** *__c safe for child 48.97%___ _d safe for 80 year old senior 41.20%____* **(write in 2 letters from the list above, a-g)** | | | | | | | | |

*This section focuses on the maintenance of the transportation system.*

**16. How satisfied are you with the following roadway maintenance related services of the transportation system? (check one box per row)**

| | Very Satisfied | Some-what Satisfied | Slightly Satisfied | Neither | Slightly Dis-satisfied | Some-what Dis-satisfied | Very Dis-satisfied |
|---|---|---|---|---|---|---|---|
| a. Clearing roads of snow & ice | | | | *Mean = 5.49, SD = 1.73, n = 3270* | | | |
| b. Clearing sidewalks of snow & ice | | | | *Mean = 4.73, SD = 1.65, n = 3188* | | | |
| c. Keeping road surfaces smooth | | | | *Mean = 3.95, SD = 1.95, n = 3257* | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| d. Eliminating weeds on the roadsides | | | | *Mean = 4.67, SD = 1.57, n = 3261* | | | |
| e. Making highway signs clearly readable | | | | *Mean = 5.78, SD = 1.23, n = 3271* | | | |
| f. Making road/pavement markings clearly visible | | | | *Mean = 5.36, SD = 1.49, n = 3267* | | | |
| g. Removing roadside litter | | | | *Mean = 4.86, SD = 1.66, n = 3257* | | | |
| h. The visual appeal of the roadsides | | | | *Mean = 5.04, SD = 1.50, n = 3233* | | | |
| i. Clearing roads of debris (e.g. road kill, large objects) | | | | *Mean = 5.03, SD = 1.60, n = 3257* | | | |
| j. Rest areas for road trips | | | | *Mean = 5.36, SD = 1.45, n = 3208* | | | |
| **Now, looking at the above list, which 2 are the <u>most</u> important maintenance related services of the transportation system? __***a clear roads of snow and ice 75.76%*___ c *keeping road surfaces smooth 53.69%*_____ **(write in 2 letters from the list above, a-j)** | | | | | | | |

**17. As you can see from the questions you've been answering, transportation includes a variety of factors. How important are each of these factors that relate to transportation? (check one box per row)**

| | Very Important | Somewhat Important | Slightly Important | Neither | Slightly Unimportant | Somewhat Unimportant | Very Unimportant |
|---|---|---|---|---|---|---|---|
| a. Your **ability** to get places you need & want to go | | | | *Mean = 6.78, SD = 0.61, n = 3280* | | | |
| b. The physical layout of the | | | | *Mean = 6.36, SD =* | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| roadway system (including roads, signs & lights) | | | | *0.89, n = 3263* | | | |
| c. The **ease** of getting to places you need & want to go | | | | *Mean = 6.56, SD = 0.72, n = 3274* | | | |
| d. Overall maintenance of the highway & freeways | | | | *Mean = 6.63, SD = 0.71, n = 3275* | | | |
| e. Safety of the roadways (-highways & freeways themselves) | | | | *Mean = 6.72, SD = 0.67, n = 3274* | | | |
| f. General communications from MnDOT | | | | *Mean = 5.60, SD = 1.29, n = 3254* | | | |
| g. Addressing environmental issues | | | | *Mean = 5.76, SD = 1.34, n = 3262* | | | |
| h. Long term transportation planning (20 years) | | | | *Mean = 6.13, SD = 1.17, n = 3257* | | | |

**Now, looking at the above list, which 2 are <u>most</u> important factors for transportation?**

*_a. Accessibility55.08%* _____ *__c.Maintenance 37.15%*_____ **(write in 2 letters from the list above, a-h)**

**18. How satisfied are you with the Minnesota Department of Transportation's performance in these transportation areas? (check one box per row)**

| | Very Satisfied | Somewhat Satisfied | Slightly Satisfied | Neither | Slightly Dissatisfied | Somewhat Dissatisfied | Very Dissatisfied |
|---|---|---|---|---|---|---|---|
| a. Your **ability** to get places you need & want to go | | | | *Mean = 6.09, SD = 1.10, n = 3235* | | | |
| b. The physical | | | | *Mean = 5.79, SD =* | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| layout of the roadway system (including roads, signs & lights) | | | | *1.23, n = 3233* | | | |
| c. The **ease** of getting to places you need & want to go | | | | *Mean = 5.84, SD = 1.23, n = 3231* | | | |
| d. Overall maintenance of the highway and freeways | | | | *Mean = 4.89, SD = 1.75, n = 3236* | | | |
| e. Safety of the roadways ( highways and freeways themselves) | | | | *Mean = 5.54, SD = 1.39, n = 3232* | | | |
| f. General communications from MnDOT | | | | *Mean = 5.14, SD = 1.32, n = 3202* | | | |
| g. Addressing environmental issues | | | | *Mean = 5.06, SD = 1.34, n = 3203* | | | |
| h. Long term transportation planning (20 years) | | | | *Mean = 4.64, SD = 1.62, n = 3195* | | | |

**19. Considering what you know about the Minnesota Department of Transportation overall, how satisfied are you with the services provided (check inside one box)?**

| Very Satisfied | Somewhat Satisfied | Slightly Satisfied | Neither | Slightly Dissatisfied | Somewhat Dissatisfied | Very Dissatisfied |
|---|---|---|---|---|---|---|
| *14.4%* | *47.5%* | 22.7% | *4.6%* | *5.9%* | *3.7%* | *1.2%* |

*Mean = 5.44, SD = 1.29, n = 3068*

**20. In the next 5-10 years, what are the 3 most important things that the Minnesota Department of Transportation should be working on? (see table below)**

4. **_____SEE TABLE IN TEXT _____**
5. **_____**

**6.** _____

**21. As you think about the next generation, what are the 3 most important things that the Minnesota Department of Transportation should be working on? (see table below)**

**4.** _____**SEE TABLE IN TEXT**__
**5.** _____
**6.** _____

**22. Please indicate the extent of your agreement with the following statements about the Minnesota Department of Transportation. (check one box per row)**

| MnDOT… | Very Strongly Agree | Somewhat Agree | Slightly Agree | Neither | Slightly Disagree | Somewhat Disagree | Very Strongly Disagree |
|---|---|---|---|---|---|---|---|
| Does what is best for Minnesota | | | | *Mean = 5.40, SD = 1.32, n = 3185* | | | |
| Acts in a financially responsible manner | | | | *Mean = 4.87, SD = 1.55, n = 3161* | | | |
| Considers customer concerns and needs when developing transportation plans | | | | *Mean = 4.99, SD = 1.54, n = 3167* | | | |
| Provides helpful and relevant information to citizens | | | | *Mean = 5.17, SD = 1.42, n = 3177* | | | |

*Finally, a few questions about you.*

**23. What year were you born?19** ____ *Mean = 59.79, SD = 14.56, n = 3249*

**24. Are you…?** ☐ **Male** *67.0%* ☐ **Female** *31.9%* ☐ **Prefer not to answer** 1.1% *(n = 3270/3308)*

**25. What is the highest level of education you have completed (check one)? *(n=2971/3308)***

☐ Some high school *2.9%* ☐ Graduated high school/GED *18.4%* ☐ Some vo-tech *2.7%*

☐ Graduated from vo-tech *10.8%* ☐ Completed associate degree *5.3%* ☐ Some college *12.8%*

☐ Graduated from college *24.9%* ☐ Some postgraduate *5.1%* ☐ Postgraduate *17.1%*

**26. In what ethnicity and race would you place yourself**? *(n=2693/3308)*

**Ethnicity (check one):** ☐ Hispanic or Latino *1.2%* ☐ Not Hispanic or Latino *98.8%*

**Race (check all that apply):**

☐ Americ☐ Indian or Alaska native *1.0%* Asian *1.2%*

☐ Black o☐African American *0.8%* Native Hawaiian/Pacific Islander *0.1%*

☐ White *94.3%* ☐ Other (Please specify_____) *1.0%*

**27. Including you, how many people live in your household?** *Mean = 2.4, SD = 1.3, n = 3267*

People in household

**28. How many working automobiles are in your household?** *Mean = 2.1, SD = 1.0, n = 3271*

Household autos

**29. Do you consider yourself a person with a disability?** Yes ☐.5% No 8☐.5%

*(n = 3255/3308)*

**30. What is your employment status (check one)?**

Emp☐yed full time *52.2%* Emp☐yed part time *6.7%* Retir☐ *36.1%*

Stud☐t *0.3%* Une☐ployed *2.4%* Oth☐ *1.3%*

*self employment 1.1%*

**31. Are you a current or former employee of the Minnesota Department of Transportation?**

Yes☐ *1%* No 9☐.9% *(n = 3250/3308)*

**32. What is your annual household income before taxes (check one)?**

| | | |
|---|---|---|
| ☐ Less than $25,000 *12.9* | ☐ $50,000-74,999 *21.1%* | ☐ $125,000-149,999 *5.0%* |
| ☐ $25,000-34,999 *10.6%* | ☐ $75,000-99,999 *14.6%* | ☐ $150,000-174,999 *3.2%* |
| ☐ $35,000-49,999 *15.2%* | ☐ $100,000 -124,999 *11.2%* | ☐ $175,000 or more *6.2%* |

**Please mail the completed questionnaire back in the postage-paid envelope provided.**

***THANK YOU FOR YOUR PARTICIPATION!***

***Questions? 612 624 2250; quoxx278@umn.edu***